AUGUST 27, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

Lubricants of Tomorrow

Tailored to Tougher Jobs

—page 80

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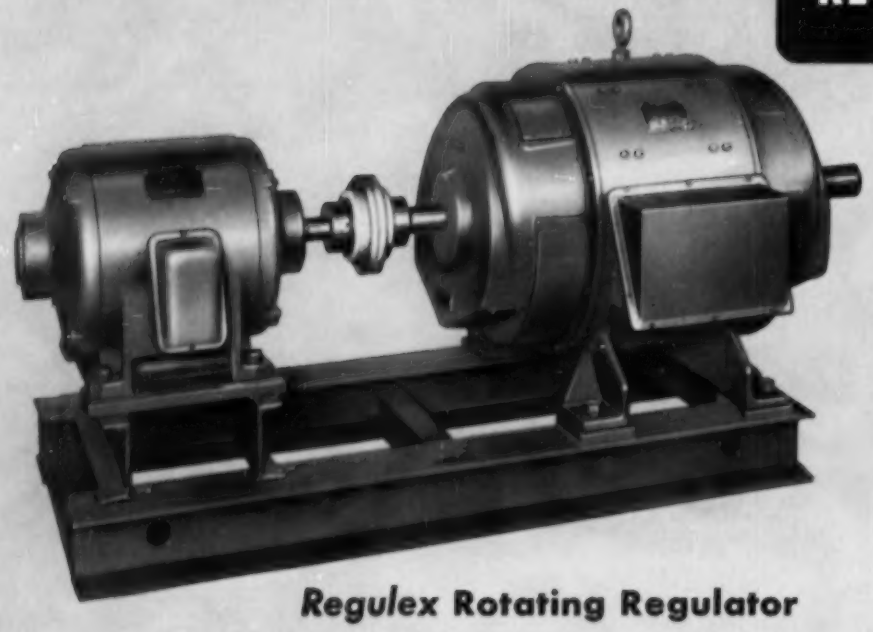
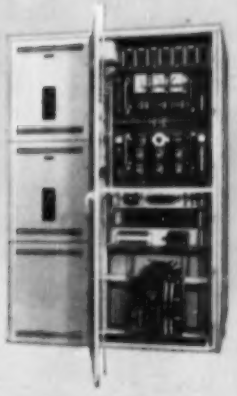
A Type and Size for Your Specific Needs

ALLIS-CHALMERS
REGULATORS



Regulex Rotating Regulator



Regulex regulator consists of m-g set and cubicle containing static elements. Cubicle may be combined with switchgear.

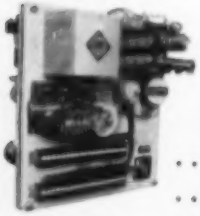
- Stability during high power-factor operations.
- Increased operating limits through automatic minimum excitation.
- High sensitivity and rapid response.

How It Works . . .

Automatic minimum excitation permits generator operation close to stability limit — much closer than manual operation. Sensitivity and quick response of *Regulex* regulator establish and maintain safe ratio between generator load and field current.

Where It Is Used . . .

In power plant application for voltage regulation of large generators or synchronous condensers. In industrial applications for regulating current, voltage, speed, tension, and reversing of processing mill equipment, and for arc-furnace control.



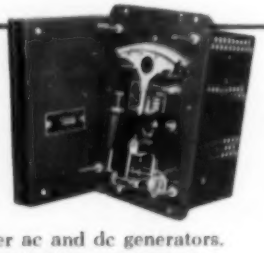
Magnetic AMPLIFIERS

. . . Low maintenance
. . . High sensitivity

Designed for applications requiring high sensitivity and response, where regulator is subjected to shock, or where continuous performance is a prime factor. Used in conjunction with *Regulex* unit when reversed polarity output is required. Since the magnetic amplifier has no moving parts it requires little maintenance.

For complete information call your Allis-Chalmers representative, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Electromechanical *Rocking Contact* Type Regulators



For voltage regulation of smaller ac and dc generators.

- Varies resistance in exciter shunt field by rocking action.
- Quick regulation over entire range with short movement.
- No sluggish relays.
- No vibrating or sliding contacts to wear.

Regulex and Rocking Contact are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5073

XVII

This is the seventeenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Uses of Aluminum in Alloy Steels

Aluminum as an element has been known to chemists and metallurgists for many years. It is never found in nature in its metallic state, being derived chiefly from bauxite, an aluminum hydroxide. Bauxite is present in various parts of the world, including several tropical and semi-tropical regions.

When used in the making of alloy steels, aluminum has several important functions. Because of its great affinity for oxygen, it is a reliable deoxidizer. It produces fine austenitic grain size. And when it is present in amounts of approximately 1 pct, it promotes nitriding. The nitriding process could be described as surface- or case-hardening by means of a nitrogenous medium, or by heating in an atmosphere of ammonia gas and dissociated ammonia mixed in proper proportions.

Other effective agents in producing nitrided cases are chromium, vanadium, tungsten, and molybdenum. As a rule, however, the hardest cases are obtained with aluminum-bearing steels, the nitriding grades being a good example. These are usually steels of medium carbon content with additions of chromium, molybdenum, and sometimes nickel.

Generally speaking, the lower the effective nitriding temperature, the harder the case will be. Aluminum-bearing steels usually show a case-hardness range of 950 to 1150 DPHN (diamond pyramid hardness number). Steels in which no aluminum is present have cases of substantially lower hardness.

If you would care to know more about aluminum as an addition or alloying agent in steels, Bethlehem metallurgists will gladly give you full information. Just write or call us; our technicians are always at your service. They will do everything possible to help make your problems easier. And whenever you need new supplies of alloy steels, remember that Bethlehem manufactures the full range of AISI standard alloy grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. 1 through XVI inclusive, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 16 topics are now available in a convenient 32-page booklet, "Quick Facts About Alloy Steels," and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

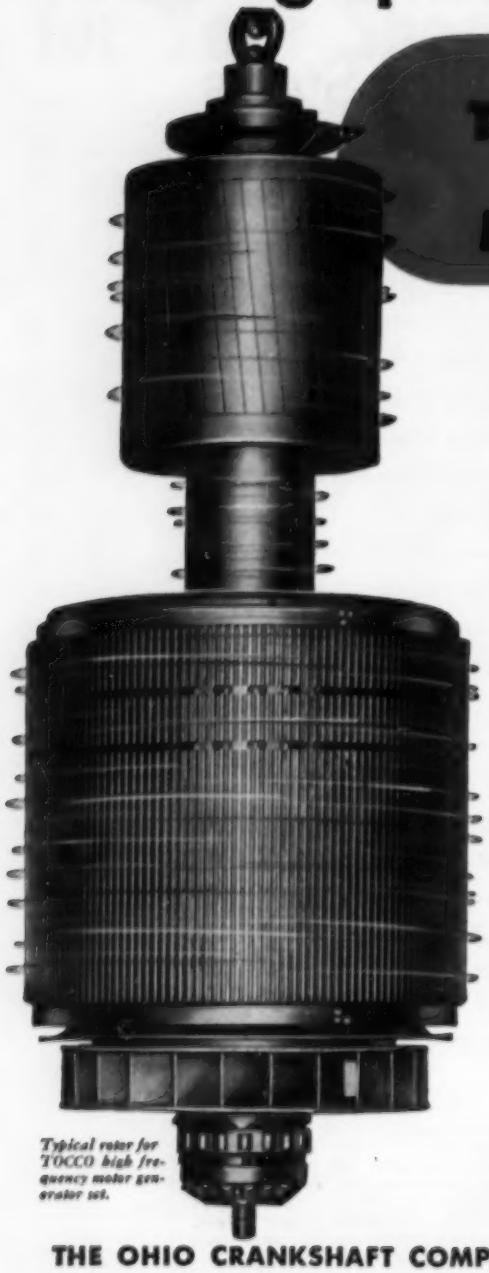
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

"Nothing Spins Like a Top"... *except*

TOCCO'S VERTICAL Hi-Frequency Motor-Generator Sets



Typical rotor for TOCCO high frequency motor generator set.

First with Vertical MG Sets—TOCCO

In 1943 TOCCO designed and built the first vertical motor-generator sets for furnishing hi-frequency power for induction heating applications. Now with thirteen years of continuous production experience, we are far and away the world's largest supplier of these units.

Advantages of TOCCO Vertical MG Sets

The large TOCCO vertical type motor generator set has numerous advantages over conventional horizontal type sets. Vertical construction permits the use of very large bearings and also minimizes the hazard of major damage to the set in the unlikely event of a bearing failure. Longer bearing life is achieved due to lower pressure and uniform loading of the bearings. Maintenance is greatly simplified because the rotor can be removed vertically with a simple hoist. Anti-vibration mountings between the base and the MG rotor-stator assembly practically eliminate vibration. No special foundations are needed. Lastly, TOCCO's vertical design cuts necessary floor space to less than one-half the area required by horizontal motor-generator sets.

Only Time-Tested Vertical MG Sets—TOCCO

There are over a thousand TOCCO vertical MG sets in actual service TODAY—more than all competitive horizontal makes combined. Write us for descriptive bulletin giving full details on the advantages and construction details of TOCCO Vertical MG Sets.

TOCCO Vertical MG sets are available in sizes up to 350 KW and frequencies from 1000 to 10,000 c.p.s.

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-8, Cleveland 5, Ohio

Please send copy of "TOCCO High Frequency Motor-Generator Sets."

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____

the gas fork truck that makes the fewest and shortest trips to the maintenance shop...

BAKER "FG"

Industrial trucks "out-of-service" mean dollars down the drain... not only repair dollars, but even more dollars for lost work. That's why we loaded the Baker "FG" gas trucks with features that mean substantially more time on the job. Here are a few:

Heavy-duty industrial truck engine operates at optimum RPM for least strain and abuse. Pistons are balanced to grams instead of ounces, crankshaft to 4 inch-ounces, connecting rods to 2 grams. Compact, rigid "power train" requires no troublesome universal joints. Clutch housing is split for better accessibility. Single oil supply lubricates entire assembly. Large full-floating, self-equalizing, self-energizing brakes have single-point adjustment.

Baker "FG" gas fork trucks, available in 3000, 4000, 5000 and 6000 pound capacities, are the only gas trucks with a full 6-months' warranty... an added assurance. Write for specific bulletins.

Baker handling equipment

THE BAKER-RAULANG COMPANY

1259 WEST 80th STREET • CLEVELAND 2, OHIO

Subsidiary of Otis Elevator Company

6G7

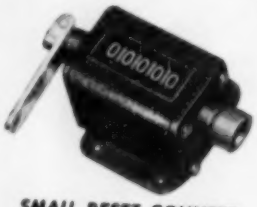
See this "Show-Case" of VEEDER-ROOT COUNTERS...

at your Industrial Supply Distributor

Useful "facts-in-figures" on practically every machine, operation, system or process in industry can be supplied by Veeder-Root Counters for mechanical, electrical and manual operation. And now Veeder-Root Counters can be supplied from stock by certain leading Industrial Supply Distributors. Find out from your own distributor how they can add to the efficiency and *Countrol* of your plant operation. And if you are selling or designing equipment, contact Veeder-Root for engineering recommendations.

Insist on Standard VEEDER-ROOT COUNTERS

from your Industrial Supply Distributor or write us on special problems



SMALL RESET COUNTER

A compact, rugged reset counter for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.

Dimensions: 1¾" long, 1 15/16" high, 1 7/16" wide

Speed: Up to 1000 counts per minute.

BOX-TYPE RESET COUNTER

For punch press installations, conveyors, metal-working equipment, die casting, plastic-molding, rivet, spring and wire machining, or any installation requiring a heavy duty counter.

Dimensions: 4¼" long, 2 1/32" high, 3⅜" wide.

Speed: 500 counts per minute.

RESET MAGNETIC COUNTER

For remote indication of machine operation from plant to office.

Dimensions: 3 1/16" long, 2½" high, 1⅝" wide.

Speed: Up to 1000 counts per minute.

Coils: 110V-AC are standard. Other voltages are available. Panel mounting feature also available.

HAND TALLY

For quick spot-checks of production or performance.

Dimensions: 1 17/64" long (to end of reset knob), 1¼" deep, 2" high.

Counts one for each depression of the thumb lever, and resets to zero by a turn of the knob.

CLUTCH SPEED COUNTER

For checking to make sure that the machine is operating at the required R.P.M.

Dimensions: 3¼" long, ⅞" max. diameter. Non-Reset.

Internal clutch operates counter only when rubber tip is pressed against the shaft.

Everyone Can Count on

VEEDER-ROOT

"The Name that Counts"

HARTFORD 2, CONN.

Stocked at Hartford 2, Conn. • New York 19, N. Y. Greenville, S. C. • Chicago 6, Ill. • Montreal 2, Canada Offices and Agents in Principal Cities

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The Metalworking Weekly

AUGUST 27, 1956 Vol. 139 No. 9

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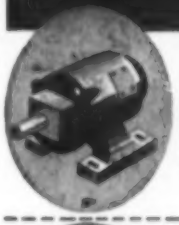
Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscriptions in the U. S. and possessions, Canada, Mexico, Cuba, Central and South America, $10 a year, other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1956, The Penton Publishing Co.

"PHOSPHOR BRONZE."

a tough, resilient, corrosion resistant alloy . . . is a vital part of our daily living . . .



ELECTRIC MOTORS

. . . run better and longer with bearings and wearing parts made of Elephant Brand Phosphor Bronze.

SWITCHES

. . . owe much of their life and usefulness to fatigue resisting parts of Elephant Brand Phosphor Bronze.

SPRINGS

. . . hold their temper and bounce longer and better if they are made of Elephant Brand Phosphor Bronze.

MARINE EQUIPMENT

. . . resists water and weather with engine parts and hardware made of Elephant Brand Phosphor Bronze.

ELECTRONIC EQUIPMENT

. . . functions accurately and efficiently with components of Elephant Brand Phosphor Bronze.

The best bears either of these two marks

ELEPHANT BRAND.

THE PHOSPHOR BRONZE CORPORATION
Subsidiary of The Seymour Manufacturing Company
3 Franklin Street, Seymour, Connecticut

DEPENDABLE
QUALITY • PRICE • SERVICE
Electro-manganese®
99.9+%
STANDARD OF THE WORLD FOR PURITY
MN®

ALSO AVAILABLE
Nitrelmang®
A Stable Nitrided ELECTROMANGANESE
Both made by the pioneer producer of electrolytic manganese.
FOOTE MINERAL COMPANY
Electro-manganese DIVISION
BOX 479 • KNOXVILLE, TENNESSEE
WRITE FOR BOOKLET

behind the scenes

Intrigue, but Not Foreign

If you've been skeptical about the new all-season motor oils on the market, take it from Bob Huber, STEEL's machine tool editor, that they're O.K.

"A matter of 180 degrees in temperature range is kid stuff," says Bob. "The man-sized problem facing researchers is to produce a lubricant which will function at —100 to 1000°F."

If this information tantalizes you, try page 80 for "Lubricants of Tomorrow." It's Bob's peek behind the locked doors of some of the country's top research labs. It's the first story on the subject in several years, and is designed to give you an overall view of a fascinating field.

Our Robert, usually a picture of sartorial perfection, has been running through the office the last few weeks in his best dirty trench coat. The significance escaped us until we learned Bob's assignment: It takes real cloak and dagger work to get the lubricant folks to talk, because many of their new ideas are unpatentable.

Comments Bob: "When you add a dash of this and a jigger of that (I mean a part), to create a new lubricant, don't expect the boys in the patent office to protect your idea. It's a little like inventing a new barbecue sauce. Your neighbor can look over his back fence any time he wants to."

Doubling for Cupid

An unusual angle turned up as an aftermath of our advertising judgment competition that ended July 9. Faithful readers of this page will remember the winner, but for the benefit of the stranger within our gates, it should be mentioned that Phil McCafferty, of Stanwood, Iowa, won the dinner for two. Penned to his entry was a humorous request to speed the dinner expenses because "his wife was going to fast until they got the money." Naturally, when infallible Phil came in a winner, we rushed the sawbuck to him with the greatest possible dispatch, expressing the hope that Mrs. McCafferty might be able to sit up, at least, and take a sip of broth.

Comes now a letter from McCafferty admitting that the lady he referred to isn't the Mrs. yet. "She's the girl friend," he writes. "Pride, vanity or something forced me to show the July 9 issue (and the check) to the gal. Can you imagine the sneaky little remarks this 'Mrs. McCafferty' stuff prompted?"

Before he ended his startling confession, McCafferty said that neither he nor his future wife (that's being subtle enough) knew what "Shrdlu" meant. That question is asked pretty regularly, so here goes the annual explanation: First off, we don't know what it means either, but here's how it originated. When a piano player whips his talented finger across a stretch of keys, he creates a glissando. When a linotype operator whips *his* talented finger from north to south across the second row of keys on his keyboard, out comes the well-known "shrdlu." If he hits the first row, he gets "etaoin." The third row produces "cmfwyp," whereas the fourth row produces "vbgkqj." So far, nobody has ever found any use for "vbgkqj."

Hails Locusts

This might be a good time to acknowledge the philosophy and poetry assembled and written to us by Faie A. Hurd while he was in his sick bed. Mr. Hurd (of Industrial Distributor Marketing Associates, Chicago) devoted days of profound thought toward the Great Seal of the U. S., in which he sees our constitutional truths metaphorically implied. Then, just when we are warming up to the eye over the pyramid, we turn the page, and read poetic greetings to the 17-year locusts, which are due again this summer, and dash it all, Mr. Hurd, if there's one thing we can skip greeting, it's a mess of locusts of any kind. It was a clever verse, though.

Shrdlu

(Metalworking Outlook—Page 41)

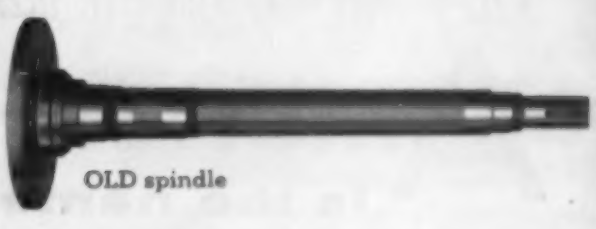
NEW 2H30 Double Spindle Grinder . . .

new spindle design improves precision—stability increased by 500%

grinds TWO parallel surfaces in ONE operation

NEW heavier spindle

500% increase in stability at rim of 30" disc



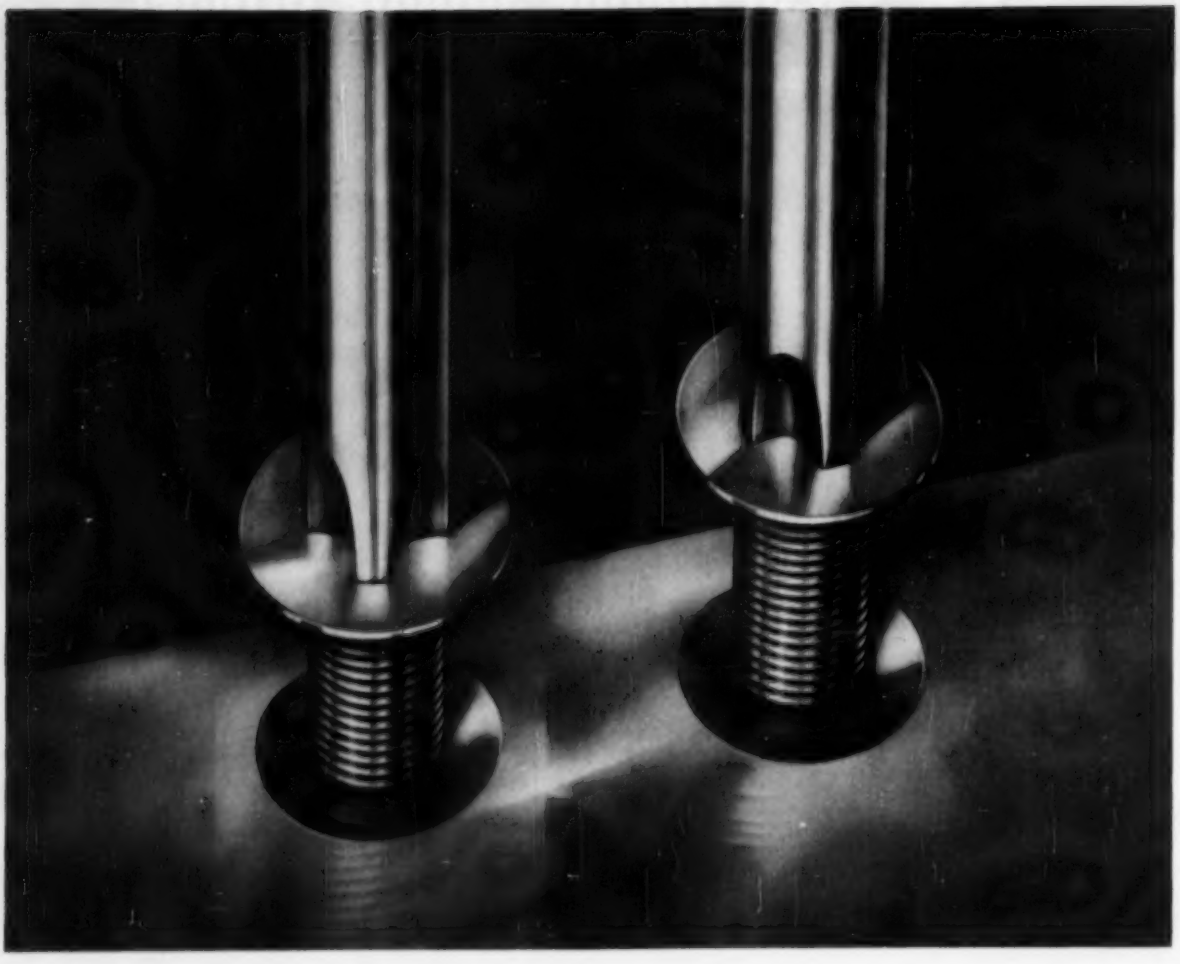
OLD spindle

Heavier spindle design in comparison with old spindle clearly shows why new 2H30 gives improved precision grinding. Note shorter spindle length combined with greater cross-sectional area that gives greater rigidity and stability. Send for your copy of the catalog describing this new Double Spindle grinder.

GARDNER

precision disc grinders

BELOIT, WISCONSIN



They may Look the same but...

American Is the name!

In your actual cost of modern fasteners are four things:

1. PRICE **3. QUALITY**
2. SERVICE **4. RESEARCH**

It is possible, as prices fluctuate, there may be places you can get a price differential at the moment. But no one gives you more of all four plus features than American.

American gives you more of all four

Certainly in service, where precision American deliveries keep any production line on schedule — like an automotive manufacturer who uses more than 600 million American Phillips fasteners a year.

Certainly in quality where qualitative checks at American are unmatched in the industry in such key areas as raw material identification and evaluation.

Certainly in research that has developed not only the Phillips Head fastener, but devised a fastener for an appliance manufacturer that cut fastening costs more than 50%.

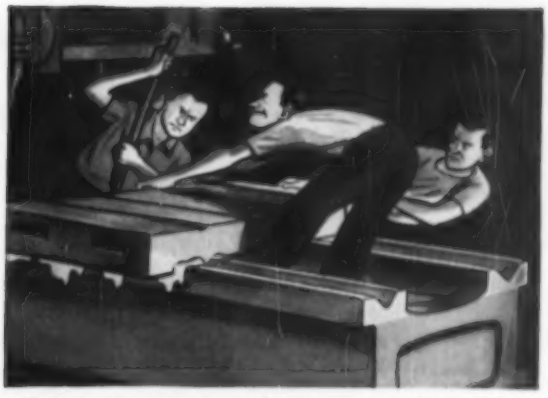
Nowhere will you find more of the four basic product features you want than from American — price, service, quality, research.

Make your own comparisons . . . send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

1. Cures "stick-slip" or "jumpy table". When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Sunoco Way Lubricant®. Special polar compounds in Sunoco Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.



2. Doesn't squeeze out. When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

WHY SUNOCO WAY LUBRICANT CAN HELP CURE YOUR MACHINING PROBLEMS

3. Protects expensive ways. Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-to-metal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.

For the lubrication of slides
and ways on this machine
we recommend the use of
SUNOCO WAY LUBRICANT
a product of
SUN OIL COMPANY

4. Approved by more than 55 machine-tool builders. Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.

For more information, see your Sun Representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-8.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

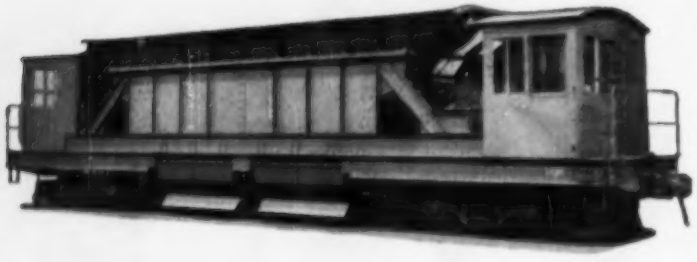
PHILADELPHIA 3, PA. SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO and MONTREAL

SUNOCO

HERE'S *built-in* STAMINA *that spells* DEPENDABILITY

10-TON SCALE CAR, SINGLE HOPPER, BOTTOM DUMP



75-TON ORE TRANSFER, GABLE BOTTOM, SIDE DUMP

Atlas "single-lever" Safety-Type transfers give outstanding short-haul service . . . such as between buildings, for cross-bay crane service, and movement in production. Powered to meet your operating needs . . . storage battery, diesel or gas-electric, or cable reel.

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Profits from CO_2 Process

You did a fine job in writing up the CO_2 core hardening process in your article, "CO_2 Speeds Coremaking" (Aug. 6, page 111). I enjoyed reading it and learned some things about the process.

Walter L. Seelbach
President
Superior Foundry Inc.
Cleveland

We found this article most interesting and would appreciate it if you would forward 25 copies.

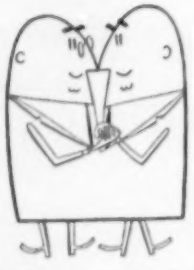
Stanley B. Wentz Jr.
Sales Department
Pennsylvania Foundry Supply & Sand Co.
Philadelphia

Production Interests Canadian

Please send three reprints of your article, "Holes Forged In" (July 2, page 67), the second of the Production Ideas series. We are the largest suppliers of cored forgings here in Canada and are interested in methods of production in any other country.

G. E. Lofthouse
General Manager-Upton Road Branch
Canada Metal Co. Ltd.
Upton Road, Scarboro
Ontario

Merger Draws Response



PLEASE SEND US 100 REPRINTS OF THE ARTICLE, "TO MERGE OR NOT TO MERGE," AUG. 13 ISSUE.

J. C. Sears
American Gear Mfrs. Association
Washington

Please send me a copy.

Albert W. Chapple
Marketing Research
Perkin-Elmer Corp.
Norwalk, Conn.

Please forward three copies.

W. G. Kleinhomer
Research Engineer
Tuttle & Bailey
Division of Allied Thermal Corp.
New Britain, Conn.

Point on Induction Heating

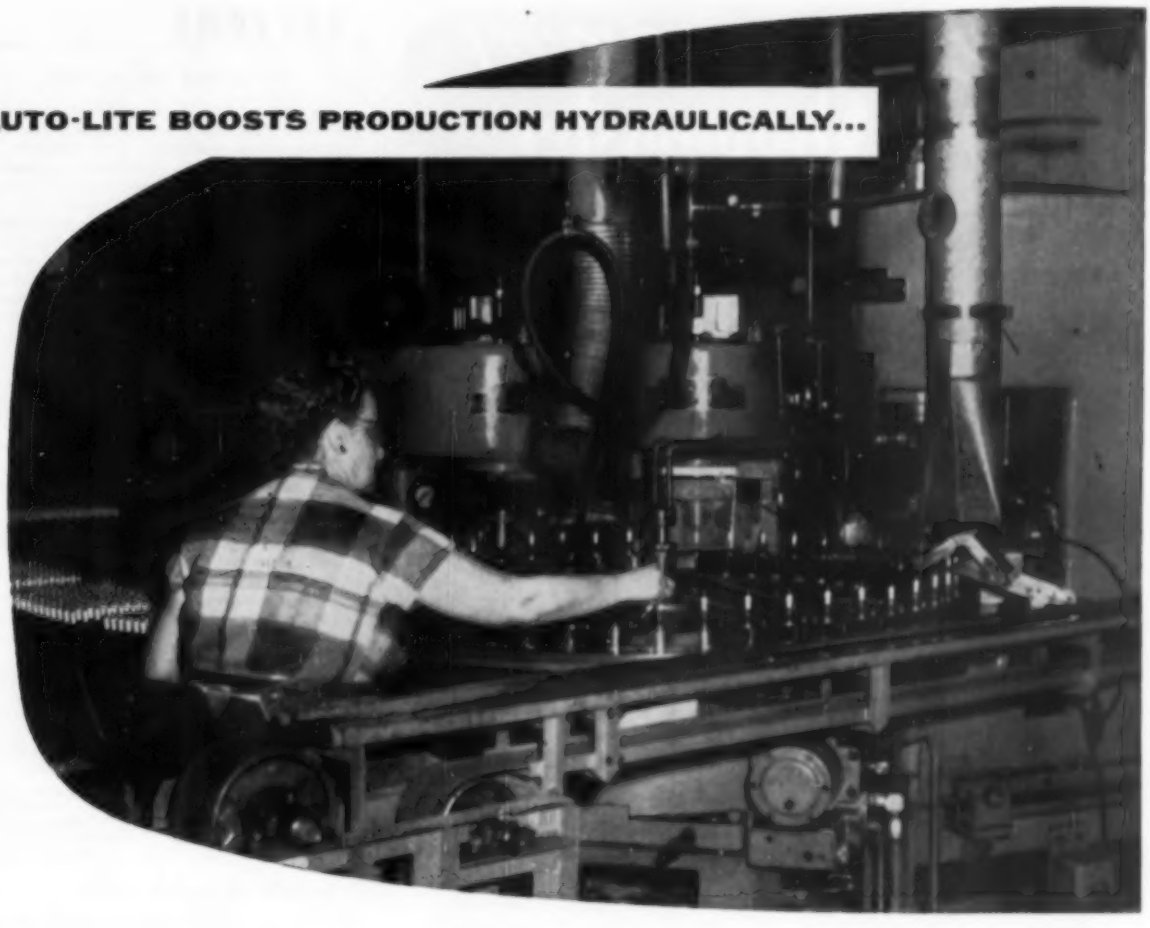
I dislike taking a sentence out of context for fear it may be improperly interpreted. But in this case, I can't see that it makes any difference.

In your article, "The Why of Flux" (July 2, page 80), it is stated: This type flux also may be required for induction heating setups where you have localized overheating in the joint area.

From this, one could conclude that induction heating always produces localized overheating. If this statement

(Please turn to page 12)

AUTO-LITE BOOSTS PRODUCTION HYDRAULICALLY...



MULTIPRESS® installation automates assembly operations

- ★ **Sets new safety levels**
- ★ **Reduces tool and die costs, eliminates down-time**
- ★ **Improves product quality, provides for future expansion**

The installation of seven 48-station Multipresses at the Fostoria, Ohio, plant of Electric Auto-Lite has introduced added efficiency into a critical production stage — final assembly of spark plugs.

One unit with a single operator (1) pre-presses the top gasket of a spark plug to centralize the insulator within the shell; (2) cold forms the shell to anchor the entire sub-assembly as an integral unit; and (3) seals the shell and insulator. These operations had required *three individually operated presses.*

Since Multipress equipment was installed, materials handling has been reduced and tool and die costs cut substantially. Down-time has been virtually eliminated; maintenance can be carried on without interrupting production. Exact control over force application is now possible, with improved product quality control a direct result.

The experience of Auto-Lite is typical of hundreds of companies who have found that a Denison Multipress, with its automatically controlled hydraulic ram, can produce a better product . . . faster, more efficiently, and at less cost. Write for complete details.

THE
DENISON ENGINEERING COMPANY
1180 Dublin Road • Columbus 16, Ohio
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HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

DENISON HydrOILics

HANDYMAN'S DELIGHT! by Shopmaster

Shopmaster 8" Tilting Arbor Circle Saw, Model HS-56

with Sewall Gears for professional accuracy

Shopmaster's new 8" tilting arbor circle saw buzzes with features to excite the Do-it-yourselfer. This "workshop-in-itself" performs shaping, dadoing, sanding plus ripping and cross-cutting . . . all with professional accuracy thanks to precision machined internal parts and gears made to Shopmaster's exacting specifications.

Sewall's complete gear service can help you . . . call us!

Custom-made gears

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Special gear racks—to order

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Our reputation is based on quality, service and price. If you're like our regular customers you're vitally concerned with these three factors when you buy gears. (1) Gears must meet your specifications exactly, in strict accordance with your prints. (2) Gears must be delivered as scheduled. (3) The price must be reasonable. Sewall gears are made by men who are fussy about specifications. We have a wide range of late-model machine tools, inspection instruments and checking equipment regularly serving customers across the nation. Our large modern plant is handy to rail, truck and air transportation.

Let us quote on your specifications!

Write for New 4-page Bulletin

The Sewall Story . . . richly illustrated with in-plant photos . . . includes listing of capacities and facilities.

SEWALL GEARS

F. B. SEWALL MANUFACTURING COMPANY

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LETTERS

(Concluded from page 10)

was made because of information available, it can safely be concluded that the observations involved were limited to the use of high-frequency oscillators where sharp corners, particularly in large discontinuous sections, will overheat.

For induction brazing, we practically always recommend motor generator frequencies, particularly for heavy sections. We build the vacuum tube oscillators, too, and, therefore, are not prejudiced as are some manufacturers whose production is limited to the vacuum tube oscillator type.

H. B. Osborn Jr.
Technical Director
Ohio Crankshaft Co.
Cleveland

Likes Management Series

I can't begin to tell you how much I appreciate your management series.

I only wish that in some of the series you could go more into details or give an indication of how you arrived at your conclusions.

Unfortunately, my copy of the third article in the series, "Ideas for Industry" (Apr. 23, page 105), has been misplaced. Could I have another?

J. R. Musch
Sales Engineering Department
Koehring Co.
Milwaukee

I don't know when I have enjoyed a series of articles more than these.

Thomas C. Smith
Supervisor
Production Processing Section
Hamilton Watch Co.
Lancaster, Pa.

Article of Great Value

We would like several copies of the article, "Save with Shaped Wire" (July 16, page 132). It will be of great value in our development engineering department.

J. S. Furry
Administrative Assistant to
Director of Engineering
Midwest Mfg. Corp.
Subsidiary of Admiral Corp.
Galesburg, Ill.

Reference for Engineers

I have read with interest your article, "Hardness Testing" (June 25, page 98) I would like reprints if available. They will be used as reference by the engineers in this department.

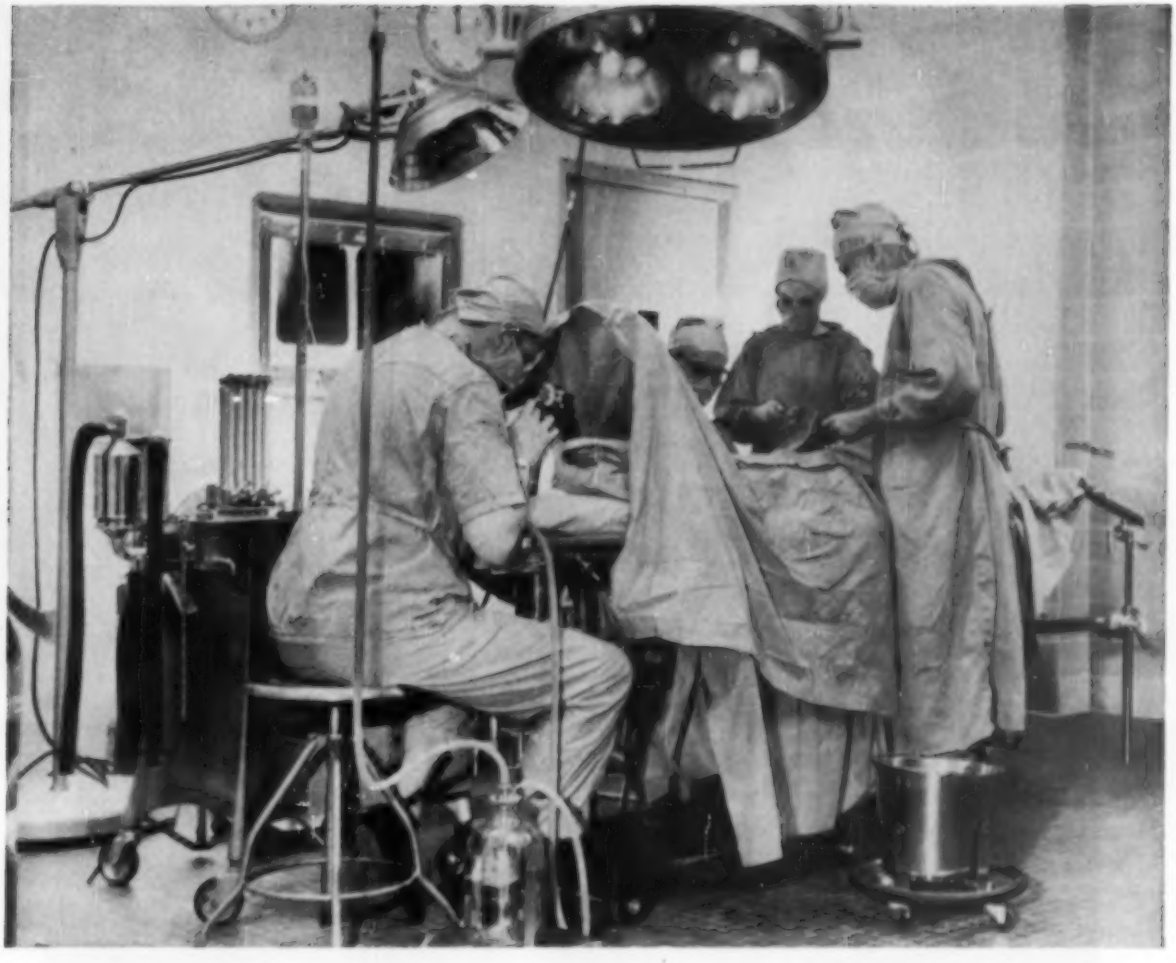
R. A. Armstrong
Supervisor-Experimental Engineering
Product Engineering Department
Automatic Transmission Division
Ford Motor Co.
Livonia, Mich.

Southern Steel Mills

We are interested in securing a list of steel rolling mills, particularly in the southern states. The type of rolling mill to which we refer is one that uses cast iron ingot molds of the small type for pouring billets. Can you furnish such a list?

Robert Ritchie
Vice President-Treasurer
Jefferson Foundry Co.
Birmingham

• *We are forwarding a list of southern producers of steel from whom you may inquire since we do not know what sizes of ingot molds these mills use.*



You trust your life to COPPER

You are relying on copper, anytime you undergo surgery in a hospital.

You may not realize it, but you are practically surrounded by copper.

The tubing for oxygen lines and anaesthetic gases . . . the vital valves on the several pressure tanks . . . many of the surgeon's instruments . . . even the closely-spaced, spark-proofing strips in the terrazzo floors or the metallic flakes in other conductive floorings—all these are of copper or one of its many alloys.

Similarly, when the product *you* make must perform without fail . . . trust *copper*!

Whether the product be *an electronic computer . . . an air conditioner . . . electric motor . . . heat exchanger . . . control instrument*—you can endow it with copper's unmatched characteristics. No substitute can do so much for your product!

And today you have a choice of *scores* of different copper-base alloys . . . each offering special characteristics . . . to make your product of today a product with a future!

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Best conductor of electricity commercially available

Does not rust . . . high corrosion resistance

Best heat transfer agent of all commercial metals

Easy to machine, form, draw, stamp, polish, plate, etc.

Welds readily . . . excellent for soldering and brazing

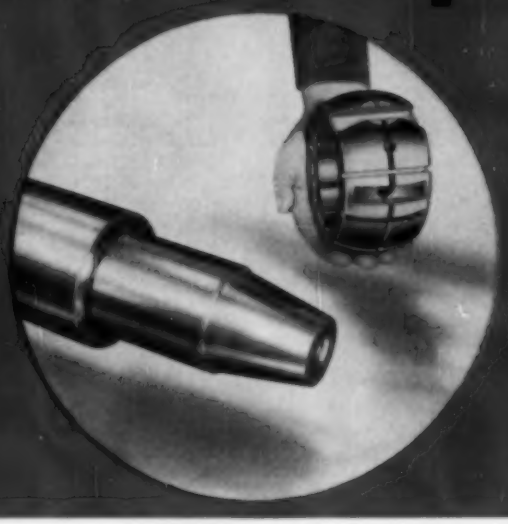
Features that reduce cost . . .

Landis 10" x 36" Type CH Plain Grinder

LANDIS

precision grinders

increase operator output



FAST STOCK REMOVAL

"Rigidized" Microsphere bearings and spindles increase production by heavy cuts without loss of finish and accuracy. A Landis exclusive.

SETUP TIME REDUCED

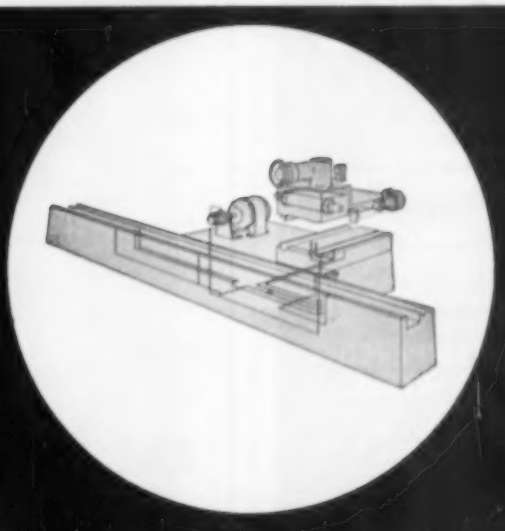
Centralized controls speed setup to give more production time. Controls handy for operator save motion and reduce fatigue.

EYE LEVEL WHEEL FEED

The wheel feed is at eye-level—Easy for operator to watch grinding and wheel feed graduations without moving.

PROTECTED LUBRICATION

Automatic spindle and way lubrication for dependable operation and machine protection. This is a schematic diagram.



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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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THE WHELAND COMPANY
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FINISHED STEEL
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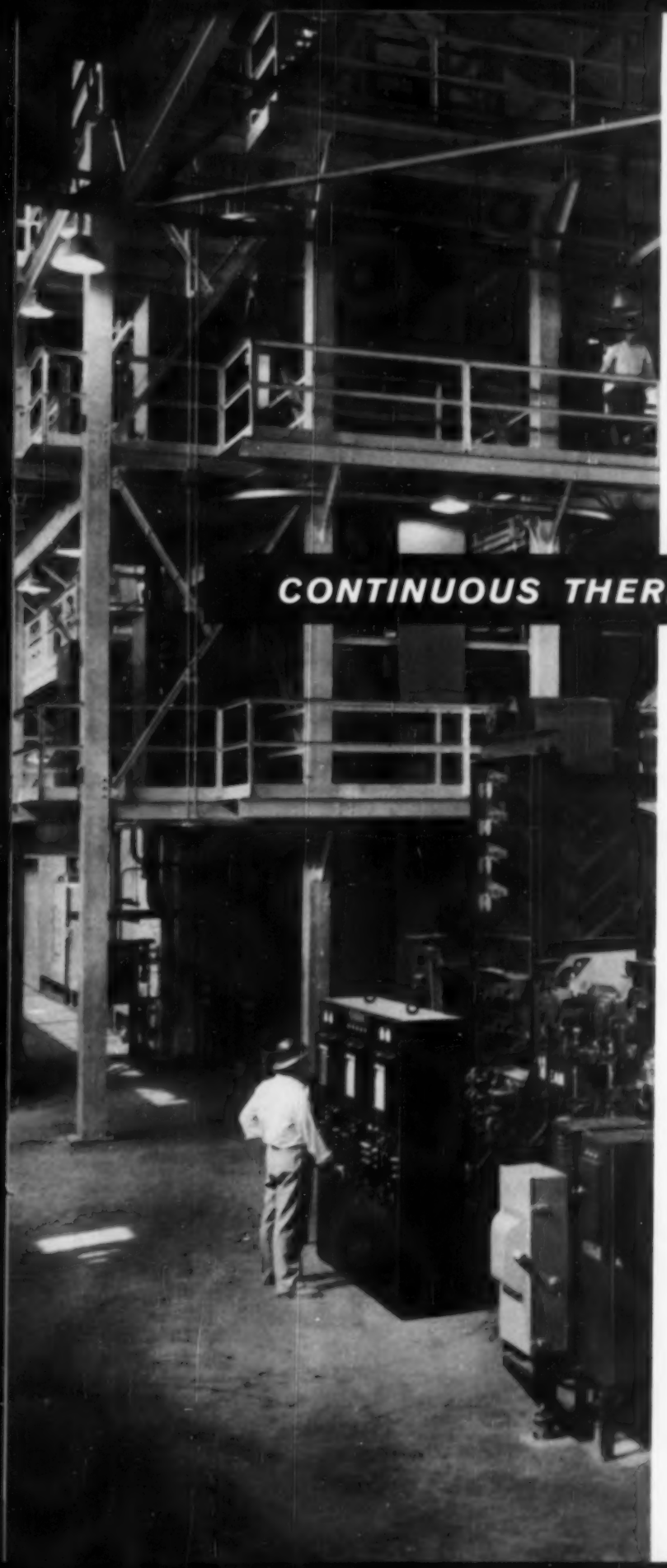


CONTINUOUS THERMAL PROCESSING...

more steel... improved quality!

A significant first in the steel industry has resulted from the recent installation of three new and identical annealing lines, each designed to deliver 20 tons of improved-quality silicon steel per hour.

This continuous annealing operation in a limited area created an unusual problem in control accuracy and reliability. Westinghouse MAGAMP* magnetic amplifier regulators form the heart of the control system . . . make this the first all-magnetic amplifier continuous annealing line. Westinghouse furnished complete electric equipment and furnaces for all three lines.

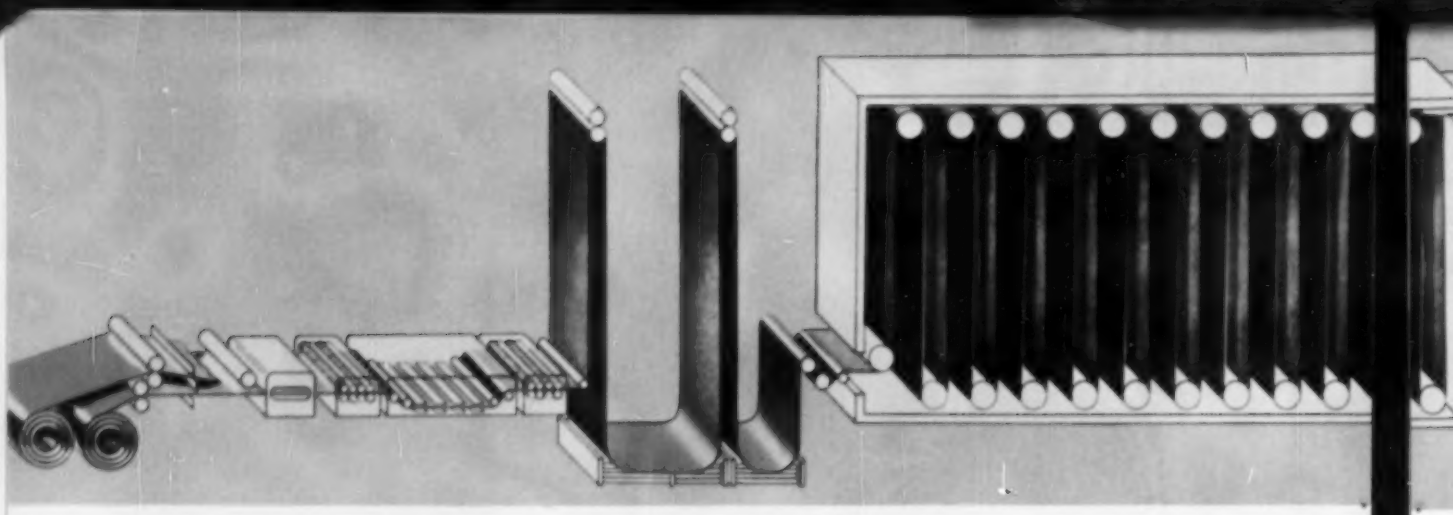
And . . .

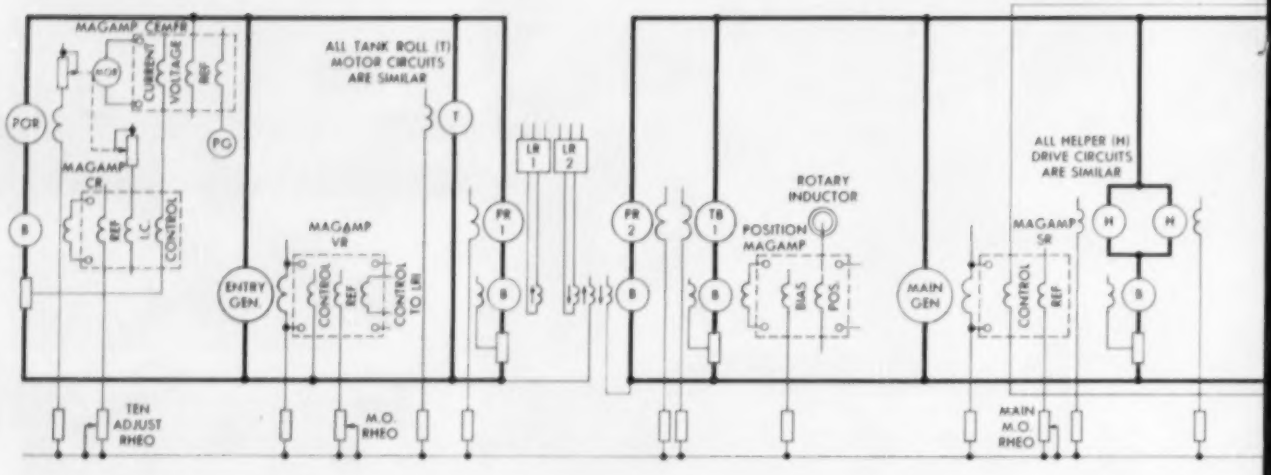
Here's another big development in the steel industry →

*Trade-Mark

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***





Tin-plate annealing equipment designed for . . .

Process speeds beyond 2000 fpm, output 60 tons per hour!

Tin-plate annealing lines now being built will be capable of boosting output as much as 100% over existing continuous lines.

Continuous annealing lines are from 300 to 400 feet in floor length. Since the strip travels through many vertical passes, several thousand feet of tin plate are accommodated in the line between the pay-off and winding reels.

High-speed annealing operations like this demand the ultimate in coordination and reliability. Westinghouse motors, controls, furnaces and related equipment will help you handle speed and output up to and beyond 2000 fpm, 60 tons per hour—while maintaining precise quality standards. Moreover, Westinghouse accepts full unit responsibility for the electric and furnace equipment installed in your line.

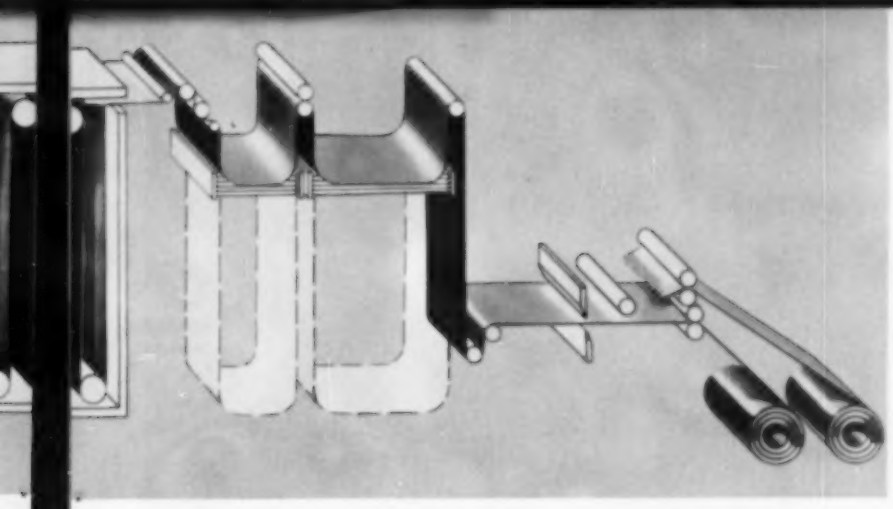
How Line Control Operates

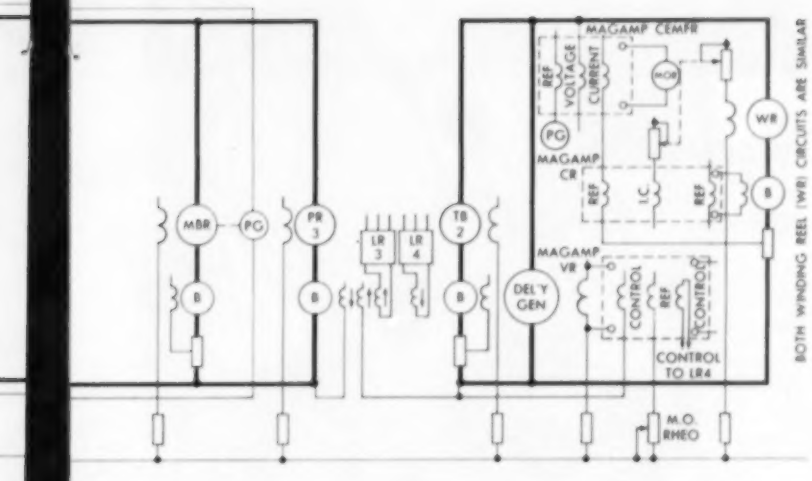
Westinghouse has many years of successful experience applying MAGAMP regulators to drive systems. Above diagrams show how Westinghouse MAGAMP regulators are applied in modern, continuous annealing lines.

MAGAMP speed regulator (SR) maintains constant speed through the critical annealing zone. Speed reference, set by main motor-operated rheostat (MOR), is

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***





balanced by the control winding fed from the pilot generator (PG) driven by the master bridle roll (MBR).

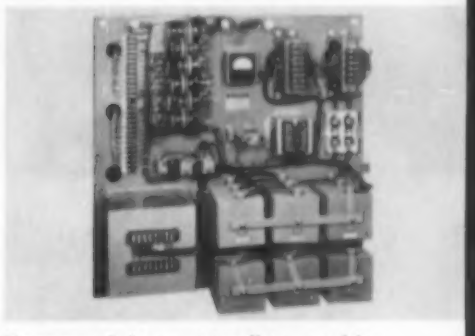
MAGAMP voltage regulators (VR) control the voltage of the entry and delivery generators assuring fast, even acceleration and deceleration and a minimum of loop disturbance during steady operation. Loop regulators set as verniers in controlling generator voltages.

MAGAMP current regulator (CR) for booster, and MAGAMP counter-EMF regulator (CEMFR) for motor, work together so regulated tension is maintained by the pay-off reels (POR) and winding reels (WR). Inertia compensation (IC), proportional to accelerating loads, and stall tension signals are introduced through the (CR) circuits.

Photo-thyratron loop regulators (LR) provide modulated control of storage loops for smooth operation.

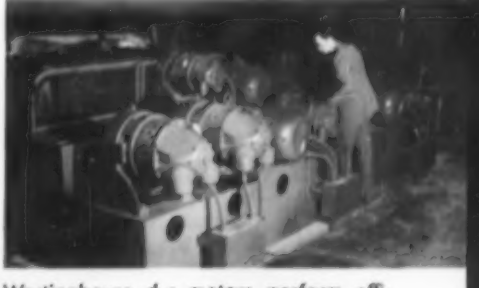
Machine characteristics are selected for best drive performance. Pinch roll no. 1 (PR-1), master bridle roll (MBR), and tension bridle no. 2 (TB-2), the pacesetters of their respective line sections, are shunt-wound for flat, speed-load characteristic. Helper drives (H) have high drooping characteristics which result in their developing only the power required to overcome their friction losses and inertia loads. Reel motors have high overload capacities suitable for accelerating the large coils which are now used in most mills.

Centralized line control reduces space requirements and provides ready accessibility for inspection.

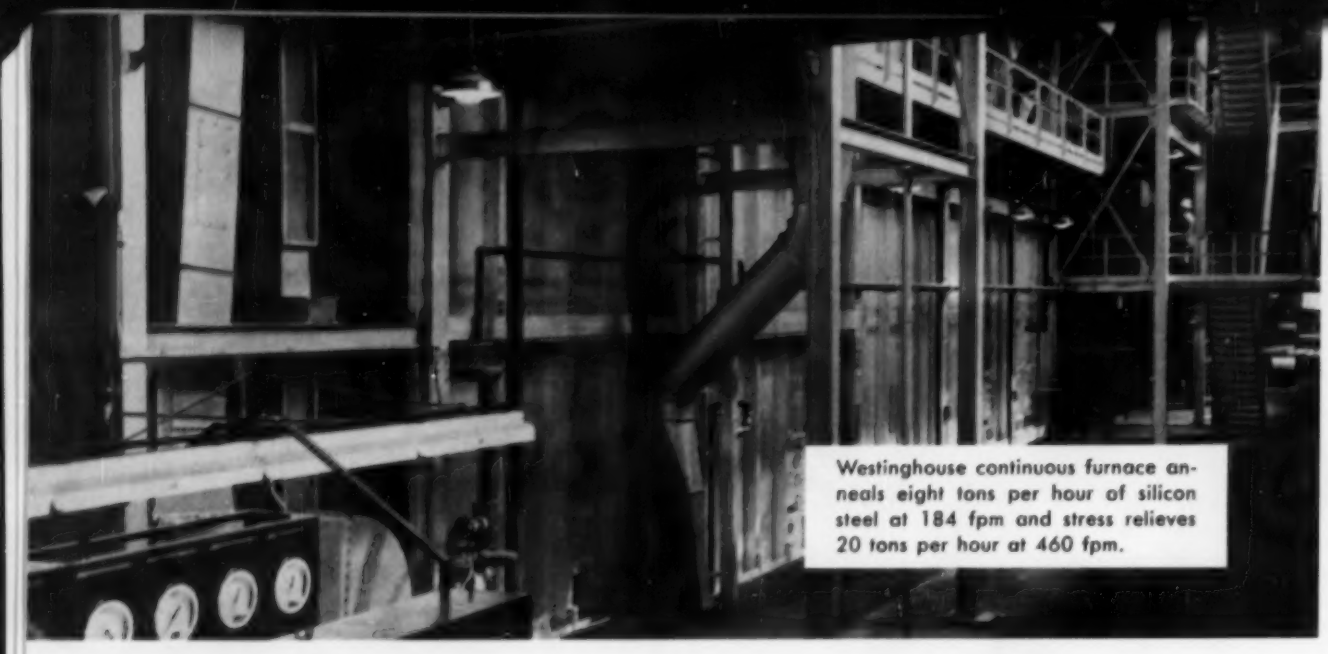


Magamps bring outstanding precision, dependability to line control . . . no moving parts, brushes, commutators, bearings.

New Westinghouse fault finder monitors control circuits simultaneously, indicates faults instantly and makes trouble-shooting easy.



Westinghouse d-c motors perform efficiently under tough conditions. High starting torque ideal for high inertia loads.



Westinghouse continuous furnace anneals eight tons per hour of silicon steel at 184 fpm and stress relieves 20 tons per hour at 460 fpm.

Three ways Westinghouse furnaces match increased annealing speed

Westinghouse gas and electric furnaces meet the demands of today's high-speed thermal processing and annealing lines three ways:

Construction—furnace layout compensates for thermal expansion. Maximum accessibility provided for convenient replacement of burner and heating element panels and rethreading.

Temperature Control—Typical examples are: proportioning-type controls to regulate recuperative radiant tubes in gas-fired furnaces; Furnatron® regulators to maintain constant temperatures in electric furnaces.

Atmosphere—Westinghouse atmosphere generators provide controlled and protective atmosphere which maintains product quality at higher speeds. Strip is produced flatter, more uniform . . . surface is cleaner.

Westinghouse consulting, application and design engineers can speed equipment installation, eliminate problems right from the start. They help match correct products to the job, test them to assure proper operation.

From planning or problem, to design, installation and start-up . . . Westinghouse is at your service. An experienced Westinghouse team will work with your engineering staff and consulting engineers in setting up your thermal process line.

For your convenience . . . 38 manufacturing and repair service plants superbly equipped for repairing all types of electric apparatus . . . 34 renewal parts warehouses strategically located in industrial centers, open 24 hours a day.

Contact your Westinghouse sales office for further details. Ask for a copy of B-6072, *Westinghouse Drives for Processing Lines.* Or write, Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

MP-3044

Completely self-adjusting, magnetic, d-c motor brake assures safer, more positive stops and starts. Maintenance and replacements minimized.

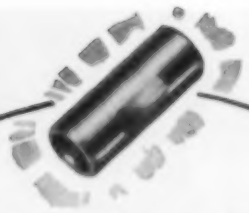
Westinghouse engineers help you plan installations like this compact a-c control center for fans, pumps and other auxiliary equipment.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

if you make or use parts like these—

*LUSTERIZED FINISH, Patent Applied For



WHY NOT SAVE 50% OR MORE AND GET A BETTER FINISH WITH

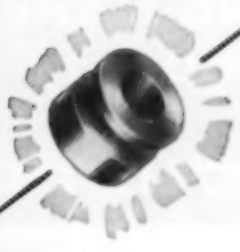
LUSTERIZED*

TRADE-MARK REGISTERED

FINISH

LEDLOY*

COLD DRAWN BARS



LEDLOY "A" leaded bar steels give you double the machining rates of C-1117 or similar steels—and 45% to 60% faster than B-1113.

LUSTERIZED FINISH adds a new ingredient of quality to Bliss & Laughlin Cold Drawn Bars which carries through to improve your fabricated parts.

LUSTERIZED LEDLOY . . . a winning combination for making better products at lower costs.

★Registered Trade-Mark Inland Steel Company

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—

HARVEY, ILL.

DETROIT, MICH.

BUFFALO, N. Y.

MANSFIELD, MASS.

1 PUNCHING — Presses used for punching holes, knockouts, and stamping small parts are strategically located throughout our plants. Some of them run at a rate of 108 strokes a minute, and their capacity runs up to 250 tons. Small boiler-jacket parts are being stamped here for United States Radiator Corporation.

2 SHEARING — Berger shears operate from 40 to 60 strokes a minute. They will cut sheet steel up to 14′ on the shortest dimensions, and medium-hard stock up to 3/8″. Operators above are shearing sheet steel that will be processed into boiler jackets for the United States Radiator Corporation.

PLANNING OR FABRICATING A SHEET STEEL PRODUCT?

...Republic can take the

You may not realize how many different products are made in Republic's Berger Division plants because many are fabricated for other manufacturers and marketed under their brand names. We will manufacture *your* product in volume runs—engineer, fabricate, finish, pack and ship, all to *your* specifications.

Some of our contract-fabricated products are completely assembled units with operating mechanisms installed. Others are sheet metal assemblies that leave our plants finished with a prime coat, ready for final finishing, assembly and packing by our customer.

Our large stock of standard tools and dies and the specialized equipment of our Berger Plants are available to you. Often we can reduce costly tooling investments because we already have the tools to do the job. Because you use our facilities, you can eliminate the overhead problems of building or expanding your plant.

Constant research and development at Berger have resulted in advanced processes and equipment to make your fabricated sheet steel products more attractive, and more economical. Furthermore, our facilities and fabricating experience provide you with the same high quality you see in our own products—lockers, office furniture, shelving and steel kitchens.

If you have a sketch or blueprint, send it along to us with complete specifications. We'll tell you promptly what Berger's specialized service can do for you. Learn more details in Bulletins 793 and 908.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

3 FORMING—Brakes running at speeds up to a stroke a second range in capacity from 60 to 500 tons making possible production of a variety of items and gages simultaneously. Operators shown here are forming boiler jacket backs. The next stop will be the welding department.

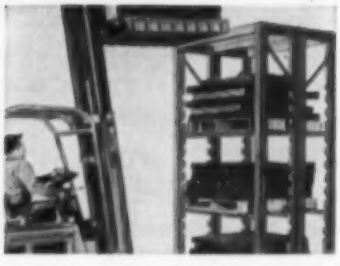
4 WELDING—Berger's major plant facilities include the very latest welding equipment and techniques. For every requirement there's a specific unit located to do the best job most economically. Eighty-eight welding units are available. The operator above is spot-welding stiffener channels.

5 PAINTING—We're equipped to paint over 87,000 square feet of steel surface each hour. Equipment includes mechanical bonderizers and degreasers for cleaning mill stock parts; 32 spray booths, six mechanical dip tanks . . . plus 40 baking ovens to assure beautiful, lasting, baked-on finish. And we can match your sample for color.

6 PACKING AND SHIPPING—Boiler jackets are shipped in cartons, knocked down. Packing equipment includes newest machines for cratemaking and automatic nailing. Beyond our doors, more advantages—you are shipping from centrally located Canton, Ohio.

whole job off your hands

INDUSTRIAL LOCKERS—These popular Republic Double Tier Lockers are fabricated at Berger, long a leader in the manufacture of all types and sizes of steel lockers for every requirement. Berger will help you plan your locker installation. Send coupon for details.



PALLET RACKS—Another Republic product made by Berger makes it easy to palletize bulky items of tremendous weight. Rack permits two-way entry . . . plus removal of pallets from any level without unstacking and restacking. Sizes available up to 10 feet high.

WEDGELOCK STEEL SHELVING—The world's strongest shelving, specifically designed for high stacking of enormous weights. Joints actually get tighter as the weight increases. There's no distortion or instability. Wedgelock is completely flexible for easy rearrangement.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-2432
3120 East 45th Street
Cleveland 27, Ohio

Please send me additional information on:

- ☐ Berger Fabricating Facilities (Bulletins 793 and 908)
- ☐ Pallet Racks
- ☐ Wedgelock Steel Shelving
- ☐ Industrial Lockers

Name_____ Title_____

Company_____

Address_____

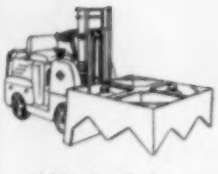
City_____ Zone____ State_____

Crane Arm

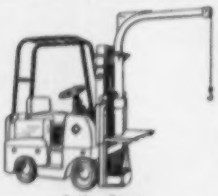
Hydraulic or Mechanical Scoop

Side Shifter

Revolving Carriage

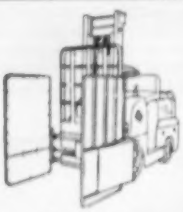

Multiple Drum Carriage

Dual Telescopic Mast


Cotton Boom

360° Rotating Carriage and Clamp

Unloader


Carton Clamp

ALLIS-CHALMERS Fork Trucks demonstrate OUT-IN-FRONT VERSATILITY

with a complete line of interchangeable attachments!

Allis-Chalmers Fork Trucks handle all forms of materials with the dexterity of skillful hands. Depending on the type of material or its container, an Allis-Chalmers Fork Truck can be equipped to scoop it, pour it, boost it, hook it, grip it, turn it upside-down . . . even skewer it.

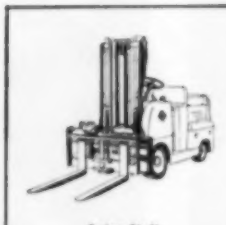
In addition to the standard attachments shown here, there are many more. Allis-Chalmers will be happy to work with you on attachments to meet your own particular material handling needs.

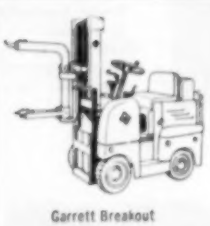
Ask your Allis-Chalmers Material Handling dealer to show you how this out-in-front versatility can speed many jobs throughout your plant, or write for more information.

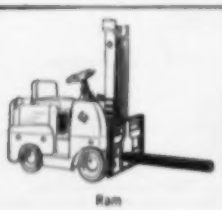
MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BH-24


Swing Shift


Garrett Breakout


Ram

Brick and Block Forks

Load Stabilizer

Extension Package Rack

Clamps

HOW USS "T-1" STEEL IMPROVES THESE PRODUCTS:

Screaming Cold. USS "T-1" Steel's amazing toughness and resistance to impact is serving "Operation Deepfreeze," the U. S. Navy's current expedition to Antarctica. Skis for rugged cargo sleds are made from ¼-inch plate of USS "T-1" Steel. In addition to exceptional strength (needed to keep down weight) and sub-zero toughness, good forming and welding characteristics were needed. Only USS "T-1" Steel met the requirements. The sleds were designed jointly by the U. S. Navy and Otaco, Limited, Orillia, Ontario, Canada.

Sizzling Hot. By redesigning with USS "T-1" Steel, crane hooks for 250-ton ladles at U. S. Steel's Edgar Thomson Works were reduced in thickness from 8½ inches to 6 inches. The resulting weight saving of 3 tons permits an increase in actual crane capacity. The ladles, too, were redesigned with USS "T-1" Steel. All told, the weight saved adds 20 net tons to the capacity of each new ladle.

28 Million Pounds of wet, abrasive coal are handled each day at this steam-electric generating station. And USS "T-1" Steel is being used at points of severe wear in coal chutes and hoppers, pulverizer feed pipes and exhaust pipes, and for liners of ash collectors. USS "T-1" Steel's durability under impact and impact abrasion, its great tensile strength and its good weldability are often essential in rugged coal handling equipment. USS "T-1" Steel can add service life and cut repair and maintenance costs in many types of heavy-duty equipment.

Repair Reduces Downtime. In this coal stripping operation, time costs more than any other item; and *lost* time, caused by breakage and wear of power shovel parts, was costing far too much. So the owner, Putnam & Greene, Inc., Philipsburg, Pennsylvania, started using USS "T-1" Steel for repair work. As a result, size and weight of parts have been reduced, while durability has been improved substantially. What's more, USS "T-1" Steel's good weldability speeds repair work.

How It Can Help You

USS "T-1" Steel, with its high minimum yield strength of 90,000 psi and its minimum tensile strength of 105,000 psi, can help you design or build lighter-weight equipment that will last longer. Its unusual toughness can help you design or build equipment capable of taking heavy impact and abuse at sub-zero temperatures. Its excellent weldability can help you cut the cost of fabricating highly stressed parts, and to reduce repair and maintenance expense. Its good creep rupture strength can help you put more durability in equipment that operates at temperatures as high as 900 degrees F.

Somewhere in your operation, versatile USS "T-1" Steel can help you. Write, wire, or phone United States Steel, Room 5437, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T1" CONSTRUCTIONAL ALLOY STEEL

USS

UNITED STATES STEEL

FAIRMOUNT GLASS WORKS, INC.
INDIANAPOLIS, IND.

"We make combustion adjustments in minutes with the Cities Service Heat Prover!"

700 employees . . . 27 acres of plant facilities . . . and a yearly production of 288,000,000 bottles—that's Fairmount Glass Works at Indianapolis, Indiana, a beehive of activity where delays can't be tolerated.

So, when furnace combustion adjustments consistently caused as much as a day's delay and gave poor accuracy, Fairmount had to find something better fast! And they did . . . in the form of the Cities Service Heat Prover. This unique, portable testing instrument makes simultaneous readings of oxygen and combustibles, keeping a constant check on combustion conditions.

Thus, Fairmount's operators are now able to adjust the amount of combustion air to the amount and kind of gas being used . . . and they do it, port by port, in minutes!

In addition, the Heat Prover has proved virtually indispensable in shifting furnaces from producer gas to gas made outside the firm. Says Plant Superintendent Cedric C. Rau, **"It's one of the most useful, versatile, and accurate instruments we've ever seen."**

The Heat Prover is supplied and maintained free by Cities Service. For further information regarding its availability and uses, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Checking Combustion in Glass-Melting Furnace, a Fairmount employee uses the Cities Service Heat Prover for faster, more accurate adjustments. The instrument is supplied free by Cities Service.

Production's Never Bottled Up at Fairmount Glass Works. They produce 288,000,000 bottles a year, use 225-250 tons of glass daily, with many machines turning out 100 bottles a minute!

CALENDAR
OF MEETINGS

Sept. 7-9, Metal Powder Association: Fall meeting. Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-12, American Institute of Chemical Engineers: Fall meeting. William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference. Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting. Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Well.

Sept. 10-13, American Society of Mechanical Engineers: Fall meeting. Cosmopolitan hotel, Denver. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 343 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feid.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting. Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and material exposition. Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Sept. 12-14, Porcelain Enamel Institute: Annual meeting. Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

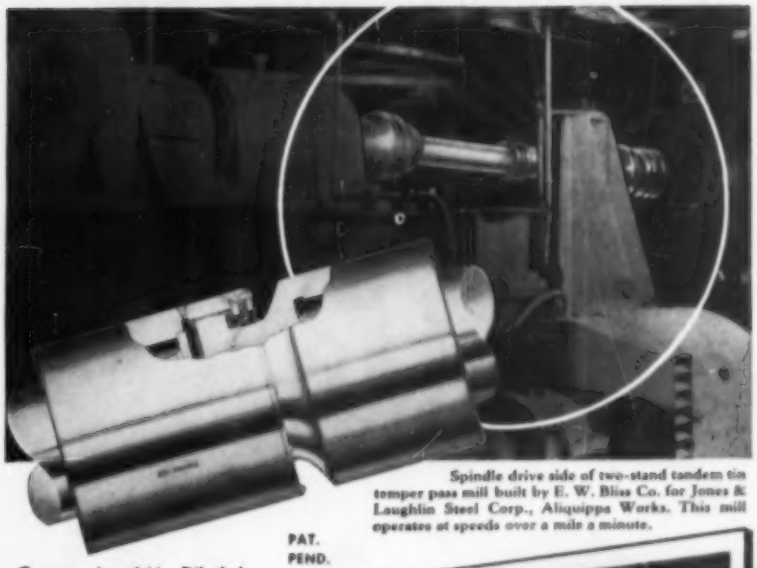
Sept. 16-20, American Society of Sanitary Engineering: Annual meeting. Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting. Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 17-21, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Sept. 17-21, Instrument Society of America: Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

Sept. 20-21, American Hot Dip Galvanizers Association: Semiannual meeting. Greenbrier, White Sulphur Springs, W. Va. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.



Spindle drive side of two-stand tandem tin temper pass mill built by E. W. Bliss Co. for Jones & Laughlin Steel Corp., Aliquippa Works. This mill operates at speeds over a mile a minute.

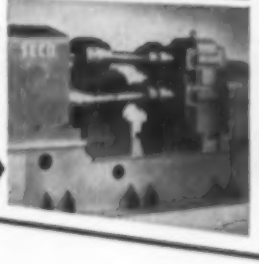
Cut-away view of Ajax Dihedral Coupling showing arrangement of teeth.

PAT. PEND.

new **FIRSTS** are being made with **AJAX** **DIHEDRAL COUPLINGS** in mill after mill

This 17" x 80" 2-high temper pass mill is cutting tonnage costs in the Fairless Works of the U. S. Steel Corp. at Morrisville, Pa.

Ajax Floating Shaft Dihedral Couplings solve angular drive problems on tilting tables for the Green River Steel Corp., at Owensboro, Kentucky.



Two Ajax Dihedral Floating Shaft Couplings driving SECO 48" heavy duty slitter in operation at McLouth Steel Co., Detroit, Michigan, cutting ¼" stainless steel at 100 ft. per min. with 16" diameter knives.

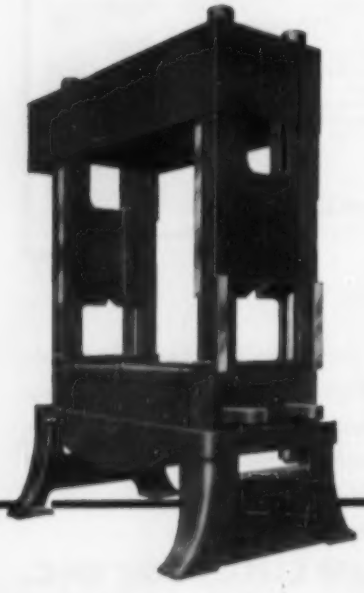
Designers and users of modern mills are achieving new high speeds (up to 7200 feet per minute), new high uniformity of gauge, new high quality finish and new high production and maintenance economies. Ajax patented dihedral tooth design is revolutionizing spindle shaft drives. Ajax Dihedral Spindle Shaft Couplings are the talk of hard-boiled steel men everywhere. Write for the facts.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.

if you manufacture parts *like these...*

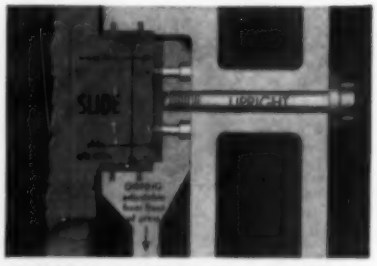
A BLISS HIGH PRODUCTION PRESS
may triple your output...or more

EXCLUSIVE DESIGN FEATURES...assure accuracy at high speed

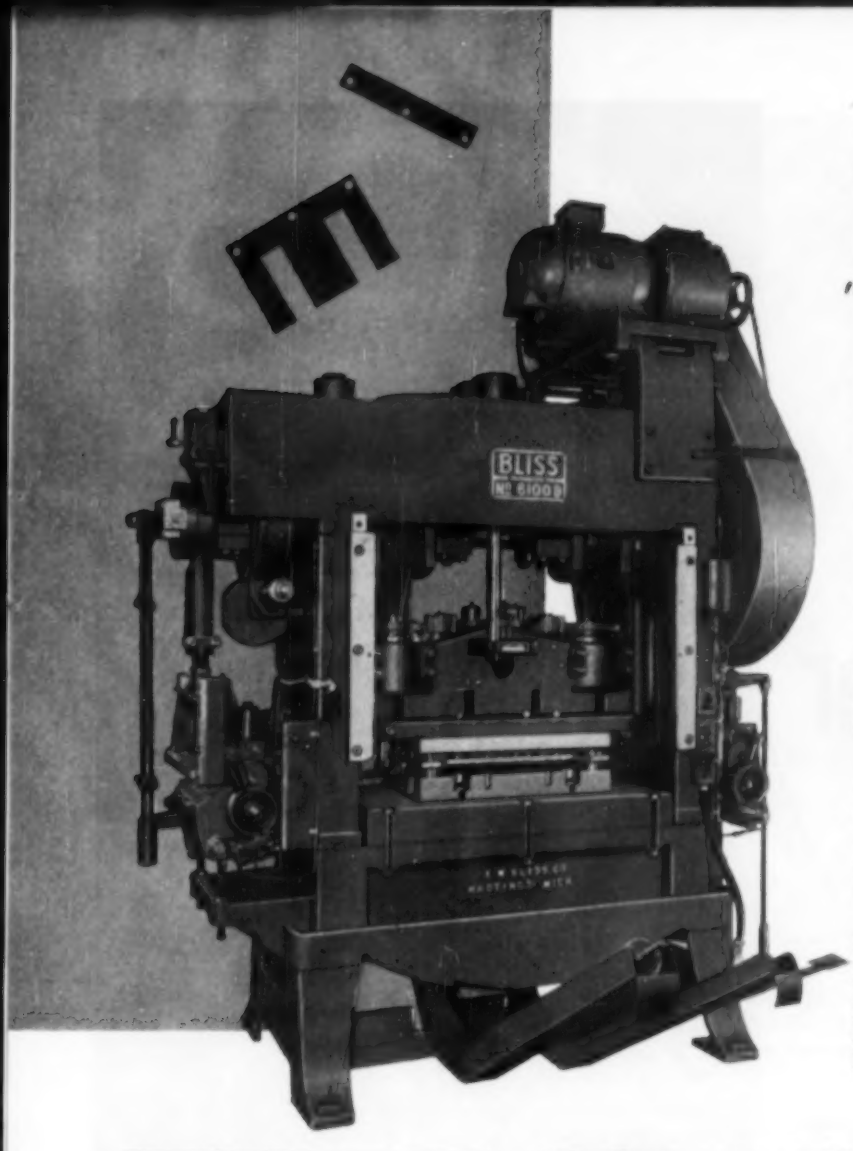


RUGGED FRAME: The dense, cast Meehanite frame *absorbs sound*, eliminates ringing "ping" at high speeds. Heavy four-piece frame members are keyed and joined by steel tie rods which are "pre-shrunk" to a tension greatly exceeding press capacity. Extra heavy sectioned bed and crown holds deflection to a maximum of 0.001" per foot at press capacity under normal loading conditions. Heavy reinforced crown gives extra support to the shaft. The design of the frame leaves plenty of room for die set up—provides chute space *under* the press.

VARIABLE SPEED DRIVES are standard on H-P presses so that each job can be run at its most efficient speed.



SQUARE GIBS provide precision fit—no more than a 0.0015" feeler goes between gib and slide, although slide moves freely. Location of gibs close to centerline resists tendency of slide to tilt under off-center loads—slide is held parallel to bed within 0.0005" per foot on all dimensions.



Long runs not essential, users report

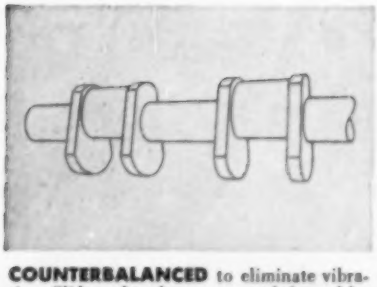
"we set up in 15 minutes, run 3000 parts in another 10..." is typical experience

Consider this: a Bliss H-P Press is usually able to replace from 3 to 12 older and slower presses. And the savings in space, tooling and handling costs alone are often enough to write off the cost of a H-P press.

But the really important saving is in the cost of the parts themselves, because you get so many more so much faster and dies last so much longer.

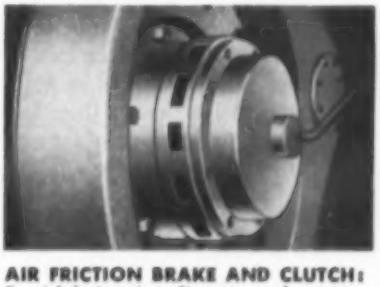
Fast set-up makes that true for both long and short run work. IBM, for example, needs only *eleven* H-P presses to turn out multi-thousand quantities of more than 1500 different parts every three months. Their average set-up time: 48 minutes.

H-P presses are available from 12 to 300 tons, non geared or single geared. Special designs, special feeds extend their use to practically all stamping requirements. We'll be glad to send you complete information by return mail.



COUNTERBALANCED to eliminate vibration. Slide and tools are counterbalanced by means of air cylinder in crown. Where top speed of press requires, the crankshaft is dynamically balanced and the throwblock for the feed is balanced by a compensating weight on the feed adjusting screw.

BLISS FEEDS: Bliss makes its *own* single roll, double roll and special feeds to assure accurate feeding at high speeds. Typical of Bliss design is its roll feed clutch—with *eight* or more rollers bearing on *Stellite* inserts in the hub, it gives greater accuracy *longer*.



AIR FRICTION BRAKE AND CLUTCH: Special design gives die setter and operator complete and accurate control of the press. Air pressure can be set so clutch will slip under severe overloads. In addition, this cool-running clutch automatically adjusts itself for wear.

BLISS
SINCE 1837

is more than a name...it's a guarantee

E. W. BLISS COMPANY, Canton, Ohio

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California; Midland and Pittsburgh, Pennsylvania. Branch Offices in Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Pittsburgh, Rochester, San Jose, Toledo, Washington, D. C.; and Toronto, Canada; E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France. Other representatives throughout the world.

Machining time reduced by using

Edgewater

Rolled Steel Rings

Weldless steel rings of simple or complex cross-sections are readily rolled to close tolerances by Edgewater. The process consists of upset forging of a steel block on a press, followed by the rolling operation, in which powerful mills form shapes such as those shown at the right. Due to the accuracy of the process, a minimum of machining is needed.

Our engineers will be glad to review your requirements and recommend a shape that will best serve you.

SEND for 12-page bulletin that describes the Edgewater process for making Rolled Steel Rings.

Edgewater Steel Company

PITTSBURGH 30, PA.

how Edgewater Rolled Steel Rings are made:

1 A block of steel is sliced from an ingot or rolled bar.

2 After soaking at forging temperature it is upset and punched in a press, forming the "blank."

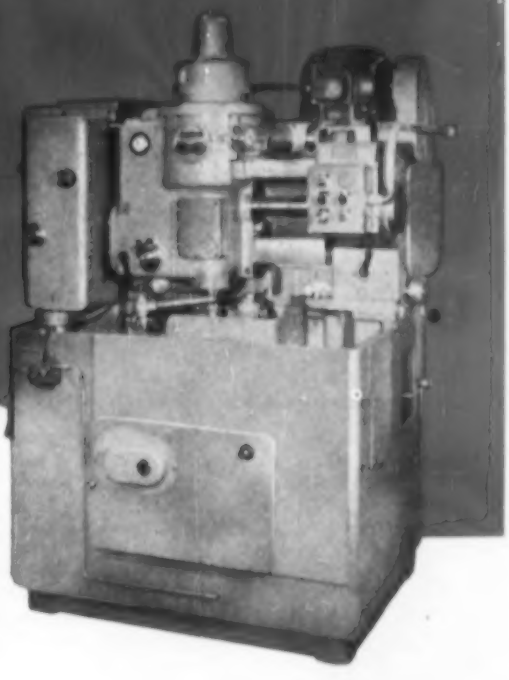
3 The rolling process enlarges the diameter, reduces the thickness, and forms ribs, flanges, etc., as required.

4 The ring is rolled to accurate shape and dimensions, in one continuous process.

typical shapes rolled by Edgewater

fastest GEAR SHAPER EVER...

for gears up to 6" P.D.



FELLOWS

No. 4GS

GEAR SHAPER

No other machine combines such versatility with such speed and accuracy! Fellows' powerful No. 4GS Gear Shaper finish-cuts internal or external spur and helical gears up to 6" P.D., 2" face width . . . with nine cutter speeds from 98 to 635 strokes per minute available through stroke change gears!

At New Process Gear Company, for example, new Fellows No. 4GS Gear Shapers lowered production time 30% on the average, save set-up time by holding to 25% closer tolerances than other shapers.

Easily adapted to semi-automatic or fully-automatic production for large runs, the 4GS is ideal too for cutting a nearly infinite variety of non-involute shapes and contours quickly and accurately. Set-ups and adjustments are simple and fast.

For full information about the No. 4GS Gear Shaper and the Fellows Precision Line, just ask your Fellows Representative. And ask him about the Fellows Plan for deferred payment. Write, wire or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 319 Fisher Building, Detroit 2
5835 West North Avenue, Chicago 39
150 W. Pleasant Avenue, Maywood, N. J.
6214 W. Manchester Ave., Los Angeles 45

THE PRECISION LINE *Fellows Gear Production Equipment*

New P&H Constant Voltage Welders Offer

BIG SAVINGS

... save hundreds of dollars in installation and wiring costs... reduce power consumption

P&H Constant Voltage Welders are easier to operate and give you better welds. You get instant starting and recovery even on tack welds, or areas of poor fit-up. They let you select the arc voltage you desire. Voltage remains constant during the entire welding cycle to give you a uniform rate of deposit.

Job-proved on all automatic-welding processes, P&H Constant Voltage Welders are used for submerged arc, inert gas, semi-automatic hard surfacing, automatic stud or low current density welding.

Enjoy high efficiency (85% or better) with P&H Constant Voltage Welders. 500, 750 and 1200-amp capacities. Send in the coupon for more information.

HARNISCHFEGER
MILWAUKEE 46, WISCONSIN

I'M SMOOTHARC SCOTTY
with some important facts on P&H Constant Voltage Welders that will save you money. Just drop me a line.

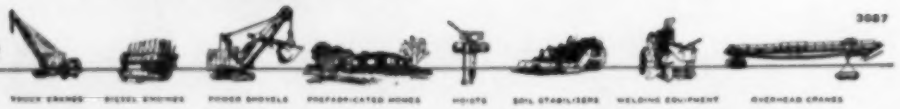
P&H Constant Voltage Welders give you more efficiency plus big dollar savings in all automatic-welding processes.

P&H HARNISCHFEGER CORPORATION
Welding Division
4411 West National Avenue, Milwaukee 46, Wisconsin
Attention: Mr. W. R. Stephens, Sales Manager
I'd like more information on P&H Constant Voltage Welders.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

SEND FOR FREE INFORMATION TODAY!

the P&H Line



3087

P&H welding equipment is manufactured and sold in Canada by REGENT EQUIPMENT MANUFACTURING COMPANY LTD., 455 King Street West • Toronto, Ontario, Canada

Rely on your AIM*... Wheeling Steel did...

Sheet steel packaging bottleneck eliminated

Acme Idea Man, R. F. Henkel helped Wheeling Steel build packaging output 300%.

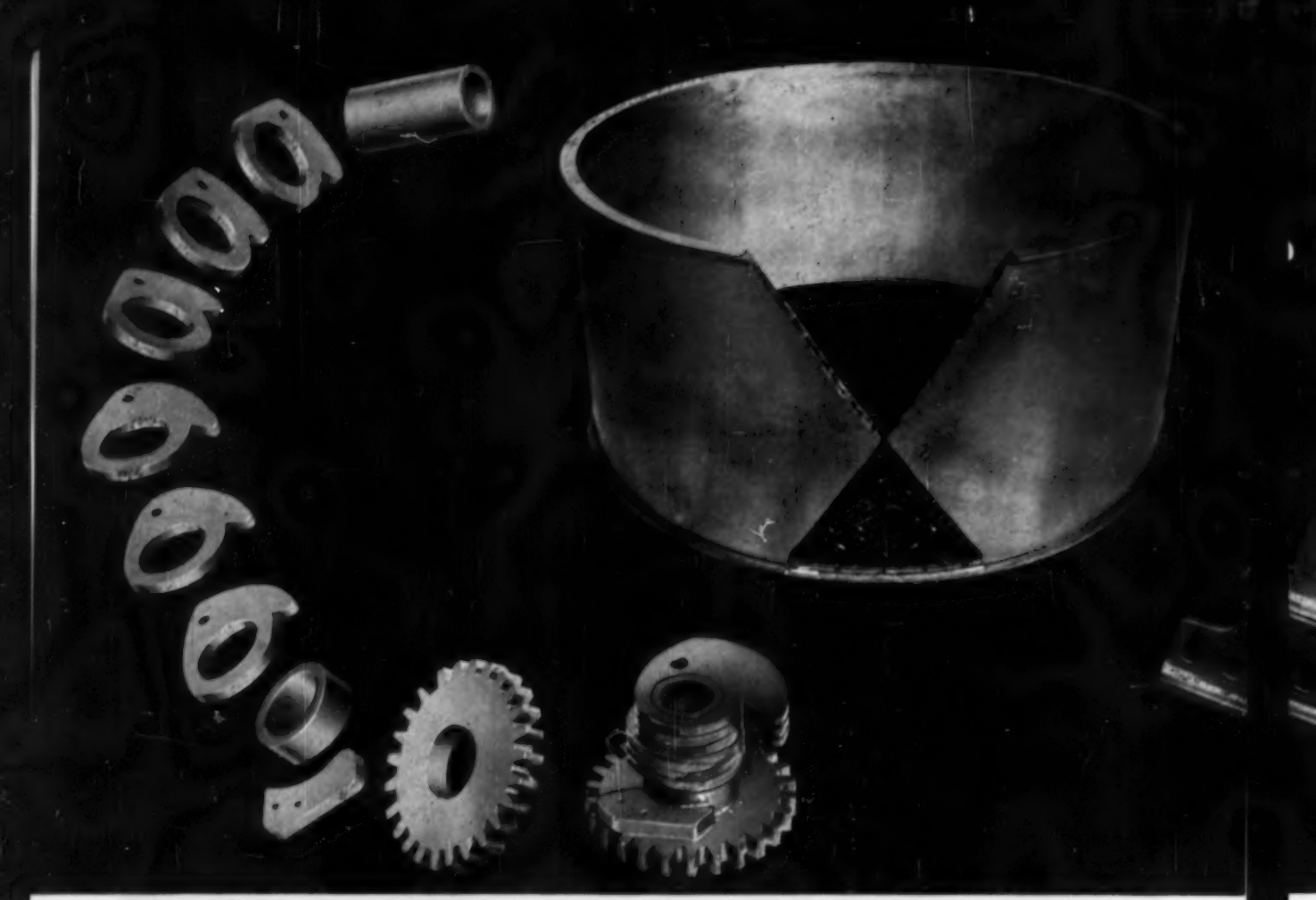
WHEELING STEEL sought an idea for speeding up steel strapping of 7-10 thousand pound lifts of galvanized "Softite" sheet steel. Manual strapping output was low because of inconvenient methods of steel strapping lifts on floor and tables. Working with their Acme Idea Man, Wheeling Steel Corporation, Wheeling, West Va., developed a centralized conveyor line and steel strapping procedure (Idea No. U6-5).

Now, varying sizes of lifts move from prime piler to transportation without manual handling. Acme Steel hydraulic tools apply heavy duty steel strapping, tension, seal and cut.

The operation is safe, fast, economical and provides stable packages for shipping and storing. Operator fatigue is minimized. Packaging output is up more than 300% per shift.

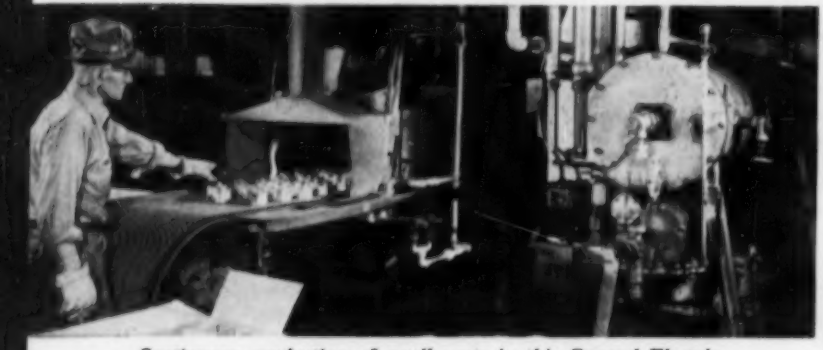
***Rely on your Acme Idea Man** for help with your packaging and shipping problems. He will discuss practical material handling techniques and their application to your operations. Call him at your nearest Acme Steel office, or write: Dept. SDU-86, Acme Steel Products Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois. In Canada, Acme Steel Co. of Canada, Ltd., 743 Warden Ave., Toronto 13, Ont.

ACME STEEL **STEEL STRAPPING**



Versatility of furnace brazing is shown in these applications. Complex assemblies like the cam-and-gear cluster on the left can be fabricated from punched laminations brazed securely in a General Electric mesh-belt furnace. Required contours are obtained without expensive machining from solid stock.

Thin sections can be joined to heavy sections to produce light-weight rigid structures without sacrificing strength or inducing local distortion. Honeycomb structure at top center weighs about one fourth as much as solid assembly of same rigidity. It is typical of design improvements made possible by brazing in General Electric furnaces.



Continuous production of small parts in this General Electric mesh-belt furnace is carried out by loading assemblies directly on the belt. Protective atmosphere equipment, at right, eliminates need for flux in most cases, keeps parts clean enough to be passed directly from the furnace, without cleaning or pickling.

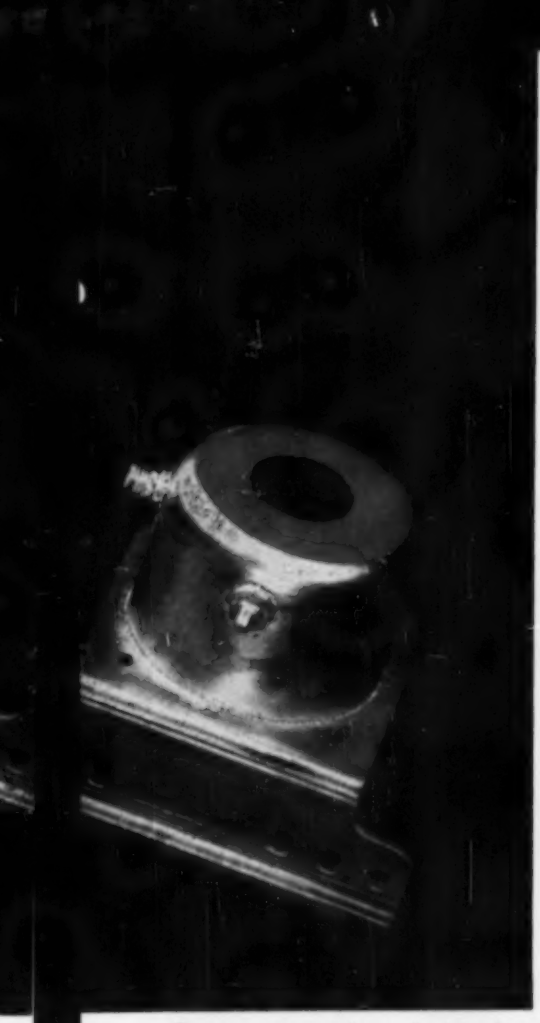
Automatic charging, and discharging and return conveyors of this General Electric roller-hearth furnace make it almost self-operating, reduces handling costs. G-E roller-hearth furnaces handle heavy assemblies and are well suited for automated lines.

GENERAL ELECTRIC SELLS A COMPLETE LINE OF HEAT PROCESSING EQUIPMENT

FURNACES • METAL-SHEATH • INDUCTION

Box | Cylindrical Pit | Roller Hearth | Elevator

Produce Complex Assemblies Faster and at Less Cost with General Electric Furnace Brazing



Two or more metals can be joined, as in the bellows housing shown above. The steel flange is furnace-brazed to a brass shell, using preplaced rings of silver brazing alloy. The desirable qualities of each metal are retained.

Development work is done in this General Electric box furnace, which could also be used for job-lot production. Low in first cost, General Electric box furnaces need little maintenance.

General Electric furnace brazing speeds production of really "tough" assemblies—and often does it at less cost than you can do it by your present methods.

For example, here are three types of work where you can improve production with furnace brazing.

You can make complex assemblies from already formed components, and save both material and machine costs.

You can make assemblies of two or more different alloys without changing the desirable characteristics of either.

You can join thin sections to heavy sections without sacrificing strength or inducing local distortion.

These characteristics of furnace brazing can be used in a number of widely different production setups. And General Electric's complete line of furnaces and associated equipment lets you pick the proper furnace to introduce furnace brazing into your particular setup—economically, efficiently.

Cost reductions are typical with furnace brazing because labor content per assembly goes down while output goes up. Waste is reduced since assemblies can be built up of components instead of being machined from solid stock. Uniformity of results frequently leads to reduced inspection costs.

Improved products are the rule with furnace brazing. Life of assemblies is increased because joints have high strength, resist vibration and impact, and are uniformly tight. Assemblies show little or no distortion, since they are free from localized strains. They present a good finished appearance without afterwork because the brazing alloy forms neat fillets. Also protective furnace atmospheres eliminate formation of oxides and do away with the need for flux in most cases.

Increased production over other joining methods is possible, since many joints can be brazed simultaneously. Furnace brazing is adaptable to continuous production, with increasing output.

For a careful analysis of your furnace brazing needs call your General Electric Heating Specialist. Ask him to show you how you can benefit by using furnace brazing. You can reach him at your local General Electric Apparatus Sales Office. If you prefer, send in coupon below for bulletins describing furnace brazing operations and equipment.

GENERAL ELECTRIC

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Section A721-8,
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- ☐ Protective Atmospheres, GEA-5907

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- ☐ Electric Furnace Brazing, GER-106
- ☐ Furnace Brazing of Machine Parts, GER-339

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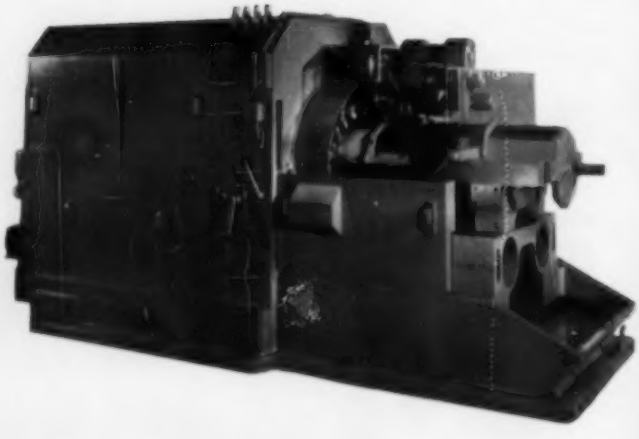
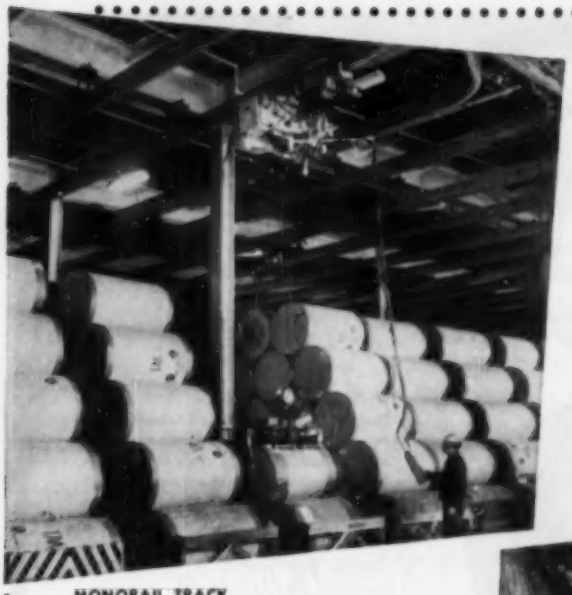
If you know chucking machines you know the world-wide reputation of New Britains for accessibility, versatility, quick setup and sustained high production of precision parts.

Now new New Britain models enable you to apply this high productivity to pieces with chucking diameters up to ten inches on eight-spindle machines, twelve inches on six-spindle production and fifteen inches on four-spindle work.

Check this practical approach to more profitable production with your New Britain representative, or write for Bulletin 3R. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.





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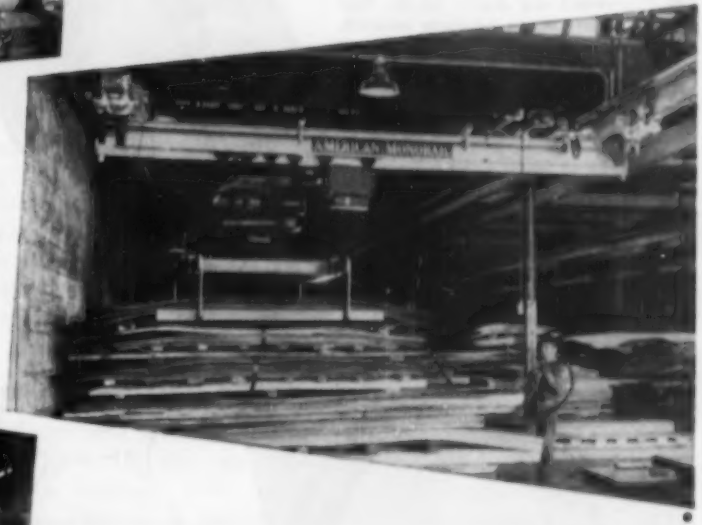

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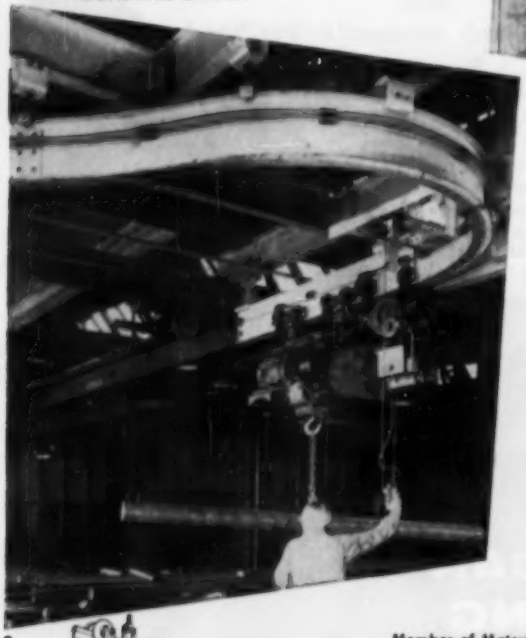

By following the guide prepared by members of the MonoRail Manufacturers Association when purchasing materials handling equipment, you are assured of getting maximum safety and minimum maintenance and still satisfy your operating requirements.

The guide represents the efforts of the combined experience of all the engineers of the association members. The specification guide has just been published.

A copy of these specifications will be forwarded on request. Write also for a copy of the American MonoRail Bulletin C-1 describing hundreds of successful solutions to handling problems.

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They are rings that offer savings of critical materials. Bar stock formed and flash welded uses considerably less material than rings made by other methods.

They are rings formed, flash butt-welded, and shaped into the finest quality circular weldments available.

They are rings that offer additional manufacturing savings. Since the rings are closer to the desired finished cross section, it is less expensive to machine them to a final dimension. Oh yes, Amweld will machine them for you.

They are rings made by a company with experience in design. We can help you select a mill-rolled or extruded shape that is even closer to the finished ring dimension. This can give you additional savings.

Yes, Amweld flash-welded rings can give you extra profit from savings on material and machining time. Amweld rings can be made of most weldable ferrous or non-ferrous metals in sizes from 4 to 96 inches.

AMERICAN WELDING

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Metalworking Outlook

Pinch in Steel

A Cleveland manufacturer who ordinarily buys steel from the mill says: "We have orders promised for May rolling that aren't shipped yet. We haven't been able to place orders for wide flange beams since early this year. Where we need that product, we substitute fabrications of plates and angles even though costs are tripled. We've gone to Canada to buy standard 12-in. channels."

More Nickel, but—

American users of nickel will consume about 260 million lb this year, some 10 per cent more than last year. A Commerce department report says the increase will occur despite the loss of all imports from France and most of them from Japan this year. In 1955, those countries furnished us between 4 million and 5 million lb of the metal. The Office of Defense Mobilization's diversion of about 70 million lb of nickel from stockpile destination has helped the supply situation. The U. S. report finds no evidence of unfair distribution by the nickel companies, and it believes the amount of nickel moving on the black market is "negligible."

Anodized Aluminum Gains

But the shortage of nickel continues because of sharply increased military and civilian demands. The hunt for alternate materials continues; one meeting increased popularity, especially from auto makers, is anodized aluminum for trim purposes. Frederic B. Stevens Inc., Detroit maker of plating and anodizing equipment, reports that six or more 1957 autos will use aluminum trim for window frames, compared with three that used it on 1956 models. Six to eight will apply it to grilles, compared with four; eight will use it for emblems, compared with four; six to nine will use it for moldings, compared with three. Sales of anodizing equipment in 1955 (for probable use in 1956) were nearly double the volume for the combined two preceding years.

Electronics: $15 Billion by 1960?

The electronics industry will have sales of $15 billion by 1960, but by then "we will have just reached the first plateau." So says Dr. W. R. G. Baker, a General Electric Co. vice president and president of Radio-Electronics-Television Manufacturers Association. Sales last year hit $9 billion, 81 per cent higher than in 1950.

The Civilian Atom

More than 1000 industrial organizations in the U. S. use atomic energy by-product materials in 1347 different installations, says the Atomic Industrial Forum. That's a 500 per cent increase within the last five years. Radioactive materials supplied by the Atomic Energy Commission are used for gaging and control operations by more than 400 organizations. Some

Technical Outlook—p. 79 Market Outlook—p. 115

Metalworking Outlook

350 firms use nuclear by-product materials in radiation inspection of welds and castings and in other metalworking operations. AEC estimates that those and other radioisotope applications now mean an annual saving to industry of $200 million per year, a figure that may reach $1 billion within the next ten years.

Industrial Furnaces: Orders Hot

In the first seven months, new orders for industrial furnaces totaled $71.6 million, compared with $46.7 million for the same period last year. Industrial Heating Equipment Association reports, however, that orders received in July declined slightly from the same 1955 month.

More Piggybacking for SP

The Southern Pacific Railway will spend more than $2 million to give its western piggybacking operations a new look. The biggest part—$1.7 million—will go toward construction of 150 new type flatcars designed to carry loaded highway trailers. The remainder will be spent to equip more than 800 semitrailers and 20 tractors of its highway subsidiary, Pacific Motor Trucking Co., with flanged-wheel dollies. The new cars will be built at the railroad's own shops at Sacramento, Calif., beginning early next year.

Prices Rising

Look for consumer prices to rise about 1 per cent over the rest of the year, considerably less than the increase in wholesale prices (see page 47). The National Industrial Conference Board reports that consumer quotations hit a new high in July; its all-items index stood at 102.1 per cent of the 1953 base.

Steel Price Device: Extra Extra

Record steelmaking scrap costs (pages 115, 137) are forcing some electric furnace operators to add a sliding scale extra to some of their steel prices. Scrap is the raw material for those producers. The extra applies only when scrap prices rise above a certain level. The trick is to keep the extra high enough to cover scrap costs but not drive away customers. A principal user of the device bases it on STEEL's steelmaking scrap price composite. In the week ended Aug. 22, it hit another all-time high—$58.17 a gross ton. Since the steel strike, the composite has risen 28 per cent.

Straws in the Wind

U. S. Steel Corp.'s National Tube Division has filed application for six certificates of necessity totaling about $156 million . . . Lone Star Steel Co. will begin work soon on a fifth open hearth . . . Motor Products Corp. still is seeking defense work to put into its Mack avenue plant in Detroit where it currently is closing out production of automotive parts . . . Wisconsin Steel Works of International Harvester Co., Chicago, and the independent Progressive Steel Workers Union agreed on a pact similar to that negotiated in the rest of the steel industry.

What has the strike done to Ryerson steel stocks?

In general, we are happy to report, our steel stocks are holding up very well—with the inevitable exception of structural and carbon steel plate inventories.

Because we entered the strike period with the largest stocks in the nation, we are still able to give quick shipment of almost every type of steel in normal warehouse quantities—even though we have not been able to replenish most stocks since before the strike began. And in some cases we can supply larger quantities to help you keep production going until your delayed mill shipments arrive. Here's a quick summary of the present status of Ryerson stocks for your guidance.

Sheet and strip—Cold rolled pattern-size sheets and coils stocks are excellent and galvanized stocks are good at most Ryerson plants. Some shortages have developed in our inventories of hot rolled sheets and coils, but when we cannot furnish exactly what you need, we may be able to supply a practical alternate from our inventories of special gauges and sizes. For example, we can sometimes furnish 13 gauge material when 12 or 14 gauge is not available.

Hot rolled carbon bars—Large overall tonnages on hand. Shortages are developing in a few sizes, but we can still take care of practically any hot rolled bar requirement.

Cold finished bars—Stocks more than adequate to meet current demand, both as to tonnage and range of sizes and types. Call us for any quantity of Ledloy, machinery steel, shafting, accuracy stock or other cold finished bar steel.

Tubing—In excellent supply. Seamless and welded mechanical and fluid power tubing, structural tubing and boiler tubes—all available in a full range of sizes, and in almost any quantity.

Alloy bars—Most all types in plentiful supply. Hot rolled alloys are not quite as plentiful as cold drawn—heat treated types not quite as plentiful as as-rolled—but we can almost always furnish your exact requirements or a practical alternate.

Stainless steels—Both straight chrome and nickel-bearing types are in good supply at Ryerson and can be furnished in almost any quantity. However, when your order for nickel-bearing stainless is covered by a rating, please be sure to extend it. You will be helping yourself by helping to assure future availability of these types from stock.

Structurals and plates—In tight supply for many months, these products continue to present the most difficult supply problem. However, check with us on your urgent requirements and we will help you if we possibly can.

Reinforcing steels—Most Ryerson plants are in a very good position to take on new reinforcing business—both re-bar and wire mesh.

Whatever your steel requirements, it will pay you to check with us. The nation's largest steel service organization is still your best source for steel of dependable quality, accurately cut and delivered to meet your schedule. As always, your inquiries and orders are sincerely appreciated.

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July 1956
Fortune Reveals

DETROIT STEEL

scored the year's biggest individual gain in sales-ranking among the 500 largest U.S. industrial corporations.

DSC Climbed to 302nd Position in 1955 from 484th in 1954 on a 97% Rise in Sales to $101,800,000

CUSTOMER SATISFACTION IS OUR BUSINESS

This sales performance offers evidence of customer confidence in DSC products and services.

It confirms our own confidence in again increasing ingot capacity from 1,290,000 tons to 1,500,000 tons and further expanding our facilities for producing hot and cold rolled sheets as well as other DSC products—in 1956.

It re-emphasizes the soundness of two basic ideas by which we have always tried to run our business:

- Customer satisfaction is everyone's No. 1 job at DSC.
- The proof of DSC steel is in its performance on the customer's job.

Thanks to our customers and employees who helped make this sales performance possible.

M. J. Inman
President

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

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DSC MILL PRODUCTS

Hot Rolled and Cold Rolled Sheets
Cold Rolled Carbon Steel Strip • Flat Cold Rolled Carbon Spring Steel
Low and Med. Carbon Manufacturers' Wire • High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement • Rope Wire • Tire Bead Wire
Welded Wire Fabric

MILLS | PORTSMOUTH, OHIO (Sheets, Rods, Wire)
DETROIT, MICH. and HAMDEN, CONN. (C.R. Strip)

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Is Bigness Bad?

We think political conventions are wonderful. The quadrennial uproars just subsiding at the Stock Yards and the Cow Palace are an agreeable part of the American scene. They are highly entertaining and mildly informative. They are a noisy reassurance that our democracy still is vigorous.

To the promises by both parties that the lot of the farmers, the laborers, the veterans, the aged, the racial minorities, the small businessmen and the small taxpayers will be improved, we listen—perhaps not with conviction, but at least without undue cynicism.

But we regret and resent the suggestion so often heard at Chicago that a businessman's administration is a single interest government, that big business representation in government feeds itself and strangles small enterprise, that the large business itself is somehow evil and to be feared.

The record 66.5 million civilians at work at peak earnings, and the whole picture of national material well-being refute the single interest charge.

That the increase in the number of business concerns in 1955 was greater than it has been in any year since 1948 gives the lie to the strangulation accusation. The June *Survey of Current Business* reports a net increase of 60,000 business establishments last year since the year before. That figure stems from a gain in the number of business formations and a decrease in the number of discontinuances. The overwhelming majority of the new businesses, of course, are small.

The caricature of big business as a bogeyman of greed and monopoly is a tired old chestnut. It seeks to perpetuate the illusion of the big businessman as a plutocrat using power and wealth inimically to the public interest.

How different is this from the businessman's understanding of our great corporations and enterprises, which are owned by millions of relatively small shareholders and directed by professional managers.

Take U. S. Steel Corp. It is big business by any definition. It has 272,000 employees. But it is owned by 296,000 shareholders. No individual holds as much as three-tenths of one per cent of its common or preferred stock.

General Electric has 361,000 shareholders, and more than 50,000 are GE employees.

Those are typical of the big businesses—publicly owned and professionally managed—which are essential to providing the goods and services for the American standard of living.

We wish, but without real hope, that the politicians would drop the snide type of attack on businessmen and business. Then it would become easier to attract skilled business administrators to the biggest business of all—the U. S. government.

Walter J. Campbell

EDITOR

Parts Like These...at Big Savings

By FLO-FORM

How can FLO-FORM* parts save you money? Simple! By forming the part, hot or cold, out of bar or wire with practically no waste of costly metal.

Harper engineers have been specializing in parts of corrosion-resistant metals since the company was founded. With this background of experience they have been able to show manufacturers new tricks in producing parts of non-ferrous metal and stainless steel that have resulted in improved quality...reduced costs.

A new book containing examples of how other manufacturers have cut costs and other valuable information is now on the press. Reserve your copy by mailing the coupon.

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Prices React to Steel's Hike

An average rise of 8 per cent in metalworking prices will cover the boost in steel prices and inflated labor costs. Increasing competition could hold prices a little lower

Many Prices Rising

Bearings—Industry is shooting for a 4 to 5 per cent increase.

Belting & Hose—Prices are up 3 to 6 per cent.

Castings—By September, prices will be up 8 to 9 per cent. Aluminum castings will go up 4 to 5 per cent. Gray iron foundries have seen their costs go up 6 to 8 per cent in the last few months.

Containers—An industry-wide boost of 10 per cent is in effect.

Cranes—One firm hiked prices 5 per cent before the strike; expects another 2 per cent boost.

Cutting Tools—There are no price leaders in this industry. One firm reports boosts averaging 4 per cent. Many are holding the line until new carbide insert prices come in.

Electrical Controls—Switch lines have gone up 8 per cent. Heavier equipment controls went up 10 per cent last April; will probably take another jump before the end of the year.

Electric Motors—Perhaps a 10 per cent hike in the next 12 months.

Fasteners—Increases average 8 per cent. This should hold the industry to the first of the year.

Forgings—In September, prices will be boosted 5 to 10 per cent.

Foundry Equipment—Coming soon: Increases of 6 to 8 per cent.

Furnaces, Industrial—One firm raised prices 5 per cent this year.

Gears—A 10 per cent jump is spreading rapidly through the industry.

Machine Tools, Standard—At least one firm has announced an 8 per cent increase effective Sept. 1. Other firms will join the parade. Another company's lathe line is up an average of 6.5 per cent.

Machine Tools, Special—Adjustments are being made, rather than across the board increases. Range is as high as 10 per cent.

Office Machines—In June there was an industry-wide hike of 3.5 per cent. Some firms see further increases in 3 to 6 months.

Presses—Expect a 10 per cent boost by the first of the year.

Continued to next page

LIKE THE $8.50 average advance in steel prices, increases on other metalworking products look like they're going to be more moderate than expected.

It will be well into next year before the readjustment is complete. Each time it moves a step farther—starting with components, moving next into machinery and finally into consumer durables—the increase will become less pronounced. This pattern is not being shaped by businessmen's big heartedness or by President Eisenhower's plea for moderation. It's the competitive system at work.

First Step—Look at the areas where a price increase is true for most of an industry. In cutting tools, for example, price increases since the first of this month average 4 per cent. They go as high as 10 per cent on bigger tools where steel is a higher proportion of costs. Some lines have even been cut; others unchanged.

Other components, like castings, fasteners, rivets and bolts, where steel cost is a stable factor for all manufacturers, show a similar sameness in their price increase. Makers of these products have had scattered increases in other costs (labor, raw materials, freight) over the last few months. Because it affected all of them at the same time to the same degree, the steel price increase was the signal for them to catch up.

Fall-Out—But even among those industries that can easily relate their production costs to the cost of raw steel, there are some holdouts. Screw machine products manufacturers, one good example, are experiencing a slip in business, mostly as a result of the cutback in auto production.

Says one large maker: "We're increasing prices 8 per cent effective Sept. 1. We don't know if everyone will." Smaller shops, particularly, may feel that competition is too tough for them to catch up with their costs.

Second Step—Machinery manufacturers, representing the second phase of the increase, are less unanimous. Reason: Steel is not so clear cut or so large a factor in

Scientific Equipment—One company president says the industry needs a 20 per cent increase. But no one is raising prices.

Screw Machine Products—Larger shops have increased prices (or will) 3 to 8 per cent. Smaller shops have not acted.

Springs—Over a period of several weeks, prices will climb 7 to 10 per cent.

Stampings—Some firms report increases averaging 8 per cent on material ordered since the strike.

Strapping—An industry-wide boost of 5 per cent, effective Aug. 7.

Trucks, Industrial—Almost all major makers have upped prices 10 per cent. The holdouts are expected to follow suit shortly.

Valves—One firm boosted prices 4 per cent in anticipation of the steel-labor boost. Another firm has gone up 10 per cent. No further increases this year are contemplated.

Welding Equipment—A leading company thinks prices must go up 10 per cent throughout the industry in the next month. Others think increases made earlier this year will carry them through 1956.

their manufacturing costs. Estimates one standard machine tool maker: "Before the steel price increase, forgings, castings and bar stock were 3.76 per cent of our manufacturing cost. By the time the increase is in full effect, these costs will have gone up, but only to 4.05 per cent of the total."

Says a Chicagoan: "Our prices will be up 8 per cent immediately. Customers seem to be taking things in their stride as long as increases are reasonable. Just yesterday I quoted a customer $21,000 for a piece of equipment exactly like the one he bought from us in 1949 for $13,000. He never lifted an eyebrow."

Perhaps the most succinct summary of the situation comes from a welding equipment manufacturer: "Since July 1, when we began to anticipate an increase in steel costs, our selling costs have selectively changed on the up side, governed by profit margins established during the previous six months. Where a line is showing high profit, we are absorbing higher labor and steel costs. Overall, our lines will probably be up 3 to 3.5 per cent by Christmas."

Third Step—Already, some of the increase is filtering through to the final phase, consumer durables. Here, its force looks as though it will again be watered down because of the fierce competition for sales.

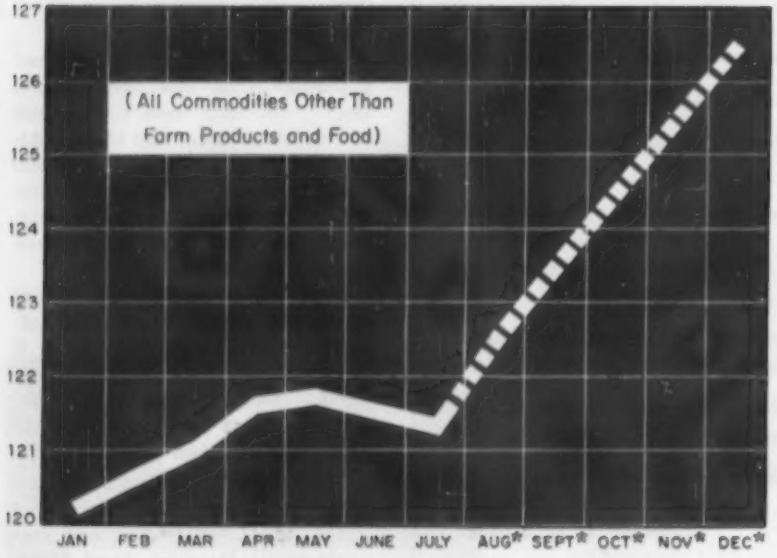
Auto company price increases, for example, in contrast with a steel price increase of 6.5 per cent and increases in some components averaging close to 7.5 per cent, are not expected to go up any more than 3 per cent on even luxury models next year. This situation is one of the many factors contributing to the over-all moderation.

Sidelight — Long-term, metalworking is becoming more optimistic about the permanence of its price structure. Steel's three-year contract is the basic reason. It permits makers of long-lead-time machinery to plan ahead. Even for makers of fast-moving parts and equipment, the fact that it's now possible to get a year-round supply of steel without fear of interruption from strikes will mean considerable economies in inventories. All will be able to do a better job with their expansion planning.

There are two schools of thought on the short-term outlook. 1. The wholesale price index (other than food and farm products) will climb to a record 126.5 (see chart), surpassing the 1955 high of 119.8 by almost 7 points. 2. Increasing competitive keenness will hold the index more closely to the 1955 pattern, causing an increase to about 124.5 by December. In the last half of 1955, it jumped 3.3 points.

In either case, continued record highs in metalworking's prices seem certain.

How Wholesale Price Index May Rise



1947-1949=100 Source: U. S. Bureau of Labor Statistics
*STEEL estimate

Vessel Strike Hits Ore Stocks

If strike ends	Stocks Apr. 1, 1957, will be
Today	13.8 million gross tons
Sept. 1	13.3 " " "
Oct. 1	10.1 " " "
Nov. 1	7.0 " " "
Dec. 1	5.1 " " "

Ore Supplies in Danger

The strike of 61 ships in the ore fleet means a loss of about 725,000 to 775,000 gross tons of Lake Superior ore a week. Some grades may be short next winter

THE CHART above illustrates the seriousness of the two-union strike that has idled nearly all the boats in U. S. Steel Corp.'s Pittsburgh Steamship Division, and others.

Stocks of Lake Superior iron ore are estimated at about 33 million gross tons. The chart is based on the assumption that the average consumption of this ore is 7½-million tons a month.

If, If—Weather has two chances to booby-trap the predictions. The chart assumes that shipments for the rest of the year can attain the high levels they hit last year. If winter comes early, supplies will receive another slash.

And no one can predict if winter's icy paw will hold back ore shipments next April. Only in two of the last ten years have the ore boats been able to get off to a start in March. If the weather is bad in April, use of ore in stock that month will exceed the amount brought down the lakes.

Strike Picture—Pittsburgh Steamship feels some progress has been made in getting its ships back to work. The unions have consented to the principle of an election to determine the bargaining agent, and, after this has been determined, have agreed to resume work while bargaining on a contract.

Last week, the company and the unions met to iron out a knotty issue, the conduct of an election. The company proposed that chief engineers and assistant engineers ballot separately to determine whether the Marine Engineers Beneficial Association, the Great Lakes Engineers' Brotherhood or neither should be their bargaining representatives.

The MEBA stand was that the Great Lakes Engineers should not be on the ballot and both engineers' groups should form one bargaining unit.

Similarly, Pittsburgh Steamship has proposed secret-ballot elections to determine if its fleet's captains and mates desire the Masters, Mates & Pilots Association to represent them. The union wants to divide the captains and mates into separate voting units.

Problems—With ore shipments as of Aug. 20 more than 11.5-million tons behind the 1955 pace and one-fourth of the fleet's capacity idled by strike, all-rail shipments of ore become possible. Shipping arrangements have been made by Youngstown district firms.

Another concern is the price of scrap. Even higher prices may come as a result of the ore shortage. A severe winter (which dries up scrap supplies) would be the crowning blow.

Westinghouse Strike Ends

A 298-day strike at the Westinghouse steam division plant at Lester, Pa., ended Aug. 7 with the signing of a five-year agreement by the United Electricalworkers local 107.

W. C. Rowland, Westinghouse vice president and general manager of the steam division, says that major provisions of the new agreement include the elimination of an unworkable incentive system, arbitration of disciplinary penalties, adoption of a new schedule of pay rates and an improved seniority system.

A thorny issue in negotiations, the discharge of 14 employees for strike violence, was handled by putting them on disciplinary furlough for 75 days.

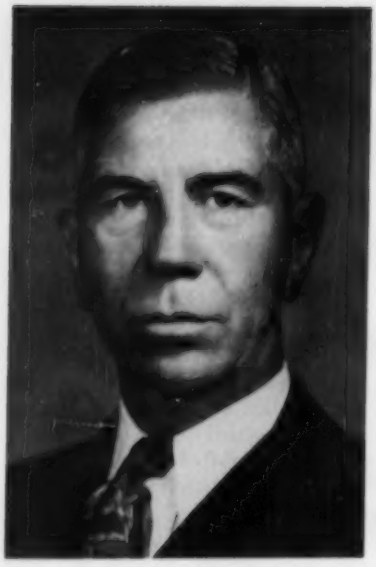
The local ratified the national agreement under which the other eight Westinghouse UE plants have been working since March. The 6000 UE-represented employees at Lester lost more than $21 million in wages during the strike.

Lea Mfg. Expanding Facilities

Lea Mfg. Co., specialist in the applications of surface finishing methods and in the manufacture of industrial abrasive finishing materials and electrochemical processes, is operating the third section of a large plant being built on Aurora street, Waterbury, Conn. The fourth section, consisting of an office and research building, will be completed in 1957.

Exomet Inc. Enlarges Plant

Exomet Inc., Conneaut, O., has announced a $200,000 expansion program. It will include a building to house furnaces for expansion of its custom alloy program.



C. M. WHITE
. . . remains chief executive

T. F. PATTON
. . . Republic's new president

New Line-Up for Republic

REPUBLIC Steel Corp., Cleveland, last week announced these changes in its top management line-up:

C. M. White, president and chief executive officer, has been elected chairman, succeeding T. M. Girdler, who retired. Mr. White continues as chief executive officer.

T. F. Patton, former assistant president and first vice president, becomes Republic's new president.

Norman W. Foy, vice president in charge of sales, was elected to the board, succeeding Mr. Girdler.

Who's Who—Mr. White had held the presidential post since 1945. Since that time, the corporation's ingot capacity has grown from 8.6 million tons to 10.3 million tons at the end of last year. By 1958, when present expansion is completed, capacity will be over 12 million tons.

Mr. Patton joined Republic as general counsel in 1936. He was elected a director in 1943 and was made vice president in 1944. In 1953 he gave up the responsibilities of general counsel when he was named assistant president and first vice president. He was a member of the four-man negotiating team representing basic steel producers in the recent strike.

Sales Picture — Mr. Foy was appointed Chicago district sales manager for Republic in 1930. Four years later, he was made assistant general manager of sales, in 1937 general manager of sales and in 1953 sales vice president.

Republic Steel Corp. is America's third largest steel producer, ranking behind U. S. Steel Corp. and Bethlehem Steel Co. Among other steel producers, Armco Steel Corp., Middletown, O., has also announced executive changes (see page 70).

Embossing Sales Rise

THE NAME consciousness of American industry is boosting the embossing business. American Emblem Co. Inc., Utica, N. Y., says more manufacturers are seeing the value of following up their advertising with a name plate. It expects sales to be 20 per cent better this year than last year.

The major volume of business, says J. S. van Vliet, the company's vice president, comes from the automotive and household appliance industries.

George Bunker, chairman, American Name Plate & Mfg. Co., Chicago, asserts: "As appliance makers tend toward more model face lifting and increase their use of trim, name plates and decorative pieces, our business will continue to increase."

Manufacture—Two methods are used to make embossings. One is akin to stamping; the other uses rolls. Embossing dies can easily be put into presses and press brakes.

J. H. Matthews & Co., Pittsburgh, says there are some 600 or 700 manufacturers of embossing dies. Many are used to emboss plastics, fabrics and paper.

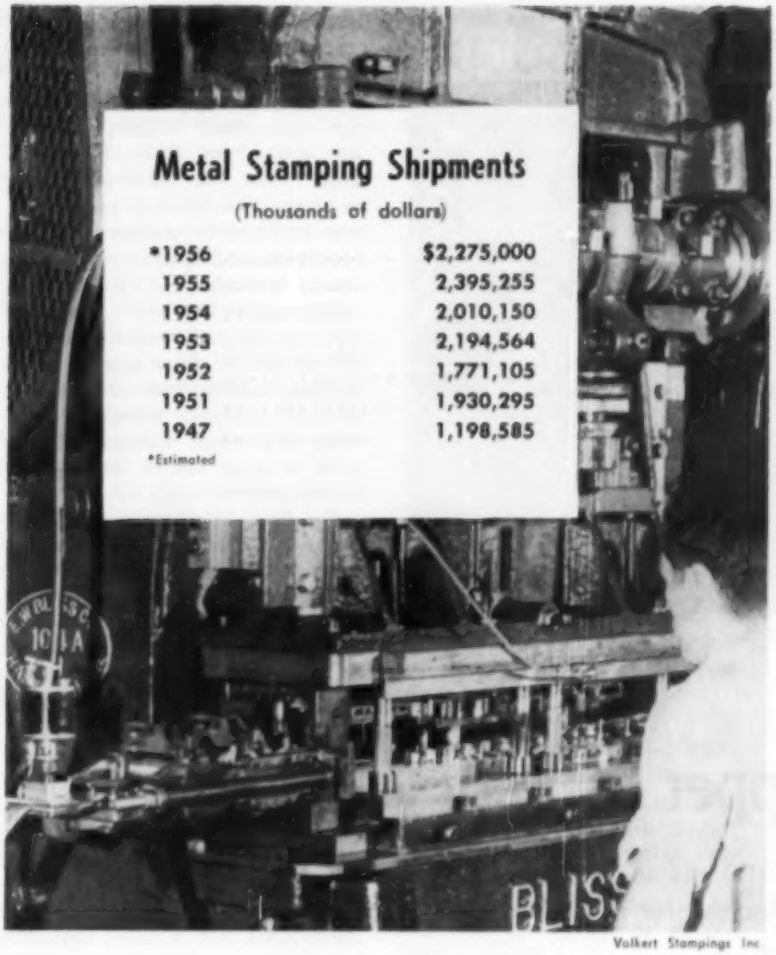
Shipping tags are a major product. A growing one: Paint companies are using the process to mark the tops of cans, so splatters of paint can't obliterate identification marking.

More Growth — Aluminum Co. of America, Pittsburgh, and Reynolds Metals Co., Richmond, Va., make embossed products which are rolled. Getting steel rolls has been the industry's limiting factor this year, states an eastern company. Mills are quoting six months for delivery, and it takes another three months to engrave them.

The biggest user of these rolls is the aluminum industry. Fabrics and paper are tied for second, and steel is third.

Along with a growth in sales to the food industry has come an increased use of aluminum foil containers. Foil is a natural for the equipment. For example, aluminum pie plates have ridges embossed into them to give them strength.

Metals most used are steel, stainless, aluminum and copper alloys.



Volkert Stampings Inc.

Despite this year's slide in the industry's shipments . . .

Precision Stamping Gains

KEEP YOUR EYE on precision stamping. Though the stamping industry's shipments will probably be off $120 million from 1955's because of the decline in auto production, the precision end of the business is running 10 per cent better than it did last year.

Metalworking's drive for lower costs is behind the gain. Precision stampings are held to tolerances of 0.005 in. and finer. Many are designed for assembly nto finished products without secondary operations. Results: Shipments are estimated at $1.1 billion, almost half the figure projected for the whole industry (see table).

Leaders — Electronic, aircraft, electrical appliance, antifriction bearing, business machine, automotive, electrical, textile and other industries are leading customers for precision stampings. In many of the country's 2400 job shops, precision work amounts to half of their sales volume.

Electrical and aircraft equipment industries are rapidly increasing their take of stainless precision stampings. Laminated Shim Co., Glenbrook, Conn., has more than doubled its stainless output. Says Merle Lockwood, vice president: "We handle more than 150 different metals and alloys, including titanium. More aluminum stampings are going to tractor and road equipment builders."

Electronics—Fred F. Rimmler, production manager of Volkert Stampings Inc., Queens Village, N. Y., remarks: "Growth in electronics has helped to push our business up 10 to 15 per cent. We use stainless and copper alloys in about equal tonnages. Tolerances on most electronic equipment stampings are held to 0.001 in."

Sylvania Electric Products Inc., New York, reports that dollar sales are up 20 to 25 per cent from 1955's. Shipments to jewelry, watch and auto industries are down, but they are more than compensated for by gains in electronics and pen and pencil markets.

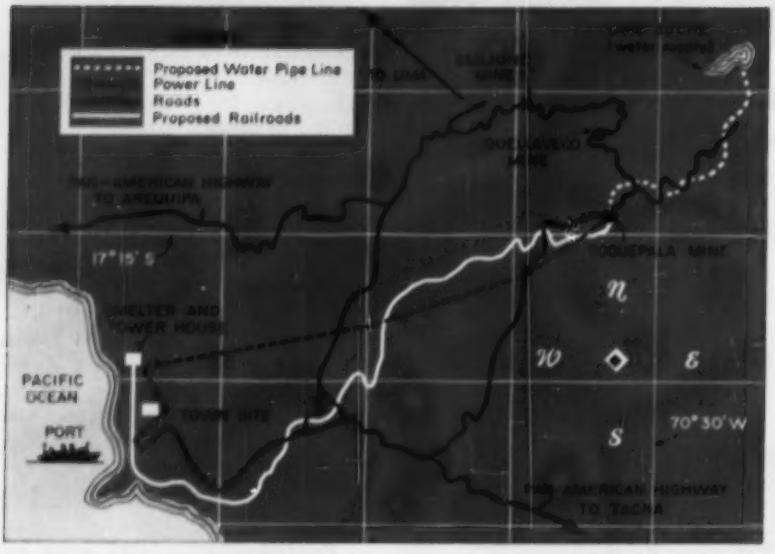
Balance—Because the auto industry is increasing its use of precision stampings per car, lower auto output hasn't hurt some precision stampers as much as it has other suppliers. For example, Buick now specifies stampings rather than castings for axle housings. Precision-stamped oil ring assemblies for auto pistons also are getting a bigger play.

Precision stamping isn't all peaches and cream. It's a problem to maintain tolerances through a production run. John E. King, sales manager, says that Worcester Pressed Steel Co., Worcester, Mass., has found that one answer is to have roving inspectors keep an eye on quality control as each precision job progresses. They have a specific route to cover, watching punch wear and gaging against specification for possible loss of tolerance. Hardness is another factor that must be precisely controlled. Results are more use of induction annealing techniques.

Outlook—Stampers believe that continuing gains are certain. The range of metals that can be handled is broadening. Marked design and engineering improvements are being made in presses, dies and auxiliary equipment.

Precision stamping is gaining sales because its markets are growing and because the cost per unit of production is being brought down.

Potential: Ten Million Tons of Copper



Betting on Copper in Peru

The Ex-Im Bank is putting up $100 million, private corporations $108 million. They're shooting for a sizable payoff: 10 million tons of the red metal

THE four nonferrous companies sponsoring the Southern Peru Copper Corp. have a big deal on their hands. Their development of the Toquepala-Quellaveco-Cuajone ore bodies in Peru involves:

1. Spending over $200 million and five years on construction before getting into production. 2. Anticipating market conditions for the next 10 to 15 years.

The Toquepala mine will be the first to produce (after 1960 by present estimates). The principals, all headquartered in New York, are: American Smelting & Refining Co. (stock ownership: 57.75 per cent); Phelps Dodge Corp. (16 per cent); Cerro de Pasco Corp. (16 per cent); and Newmont Mining Corp. (10.25 per cent). The corporation became a legal entity in 1952.

Content — The low grade (porphyry) deposits of the three properties are estimated to contain some 1 billion tons of copper ore, which can be mined profitably with open-pit techniques. Ore estimates: Toquepala, over 400 million tons; Quellaveco, 200 million tons; Cuajone, 500 million tons. The ore contains about 1 per cent copper, making the ultimate yield some 10 million tons. During the first ten years, Toquepala figures to turn out 120,000 tons of blister copper (99 per cent pure) yearly. It will be shipped to the U. S. for further electrolytic refining.

First Hurdle—Last year, the Export-Import Bank of Washington signed an agreement to lend the Southern Peru Copper Corp. $100 million to finance purchases made in the U. S. and pay for services rendered by U. S. citizens and corporations. This is the largest loan the bank ever made to a private company. To cover other expenditures, including amounts already spent for exploration and development, the four major stockholders agreed to invest about $108 million in private funds.

Getting Started — While there had been minor interest in these ore bodies for some 30 years, AS&R took the first substantial monetary risk when it began putting exploratory dollars into the Toquepala and Quellaveco properties to determine the extent of the underground deposits. Over the last ten years, it has spent some $10 million in churn and diamond drilling, building roads, conducting railroad surveys, bringing in a temporary water supply, building camp housing and in design work for the project.

Big Push—The stripping of 120 million tons of sterile overburden from the Toquepala deposit will commence in late October. Men, power shovels, trucks, bulldozers, drills and dynamite will have to be shipped into the area. A temporary diesel power plant (6475 kw) will provide power until the permanent thermic power plant can be erected.

It will take about five years to complete construction projects on supporting facilities. Some of them: 1. Building a smelter (with a capacity of 40,000 tons of copper concentrate per month) near the port town of Ylo, Peru, and a 44,000 kw thermic power plant adjacent to it. 2. Construction of a standard gage railroad. Although its air distance is only 57 miles, it will require over 100 miles of track to make the climb from sea level to an elevation of more than 10,000 ft over rugged terrain. 3. Land leveling and erection of the concentrator and associated shops, lime and silica treatment plants. 5. Installation of warehouses and piers to accommodate ocean-going vessels. 6. Permanent water supply, communications lines, townsites, company roads, etc.

Economics—The Peruvian economy will benefit through local expenditures for wages, salaries and purchases of national products during the construction period. When operations get into full swing, some 2500 Peruvians will be employed.

The Peruvian government will also receive substantial sums from taxes on profits. Toquepala's oper-

ations will add stability, through diversification, to an economy which now produces sugar, cotton, oil, lead, zinc and (up to this point) a limited quantity of copper, principally from mines owned by Cerro de Pasco Corp.

Harmony—Participating companies have operated mines in Latin America for about 50 years. Company officials and personnel feel they have the experience to anticipate the needs and aspirations of Peruvian citizens. With a long record of good working relationships to their credit, they believe management can continue in this tradition.

Crux: If the current strong market for copper holds, there is little doubt that the adjacent ore bodies at Quellaveco and Cuajone would be brought into production in the next 15 to 20 years. Many of the facilities needed for Toquepala could serve them.

Light Touch

With a helping hand from Luria Engineering Co., Bethlehem, Pa., Progress Mfg. Co., Philadelphia, plans to increase its capacity to make residential lighting fixtures, chimes and exhaust fans by 65 per cent. The 235,000 sq-ft building for the plant will be completed by Luria by Sept. 1.

Water for Ontario

Ontario badly needs water to service its fast-growing industrial complex. Pressure Pipe Co. of Canada Ltd., Toronto, will spend $2 million to slake that thirst by next spring. A 100,000 sq-ft plant which will make reinforced steel water pipe is going up near Toronto. Production will average 1000 ft a day.

ODM Issues Tax Certificates

Certificates for fast tax write-offs on 53 facilities costing over $80 million were issued in the two-week period which ended July 25.

The largest, says the Office of Defense Mobilization, went to Tide Water Associated Oil Co. The firm will get tax relief on $16.7-million worth of oil refining facilities at Avon, Calif.

Big Boosts for Basic Metals

Heading the week's expansion events: Zirconium pilot plant for Kennecott Copper; increased tantalum-columbium capacity for Fansteel; 50 per cent titanium hike for TMCA

BASIC METALS figured heavily in last week's expansion news.

Zirconium — Horizons Inc., Cleveland, will design, erect and operate a zirconium pilot plant at Bedford, O., for Kennecott Copper Co., New York. Kennecott, reveals Charles R. Cox, president, has acquired licenses for the electrolytic production of zirconium from Horizons Titanium Co., New York, the exclusive licensee of the methods developed by Horizons Inc.

Kennecott also got options for licenses covering the electrolytic production of titanium, thorium, columbium and tantalum, says Mr. Cox.

Tantalum - Columbium—Fansteel Metallurgical Corp., Chicago, will boost its tantalum capacity by 50 per cent and columbium capacity by 150 per cent with a new plant, states Dr. Frank H. Driggs, president. The facilities (cost: $6 million) will be located in another part of the U. S.

Dr. Driggs cites increased applications of tantalum capacitors and the growing requirements for columbium in nuclear experimental work as reasons for the firm's expansion.

Titanium—Output of titanium sponge will be increased 50 per cent and related melting facilities for the production of titanium ingots will be expanded 80 per cent at Titanium Metals Corp. of America's Henderson, Nev., plant.

When present expansion programs are completed, the Nevada unit will produce 9000 tons of sponge a year and 11,000 tons of ingots. Cost of the programs (including a 67 per cent plant expansion announced in March), is estimated at $15 million.

Annual consumption of titanium will hit 30 million lb of finished mill products by 1958, compared with 4 million lb in 1955, predicts a TMCA executive.

Steel—Under the heading of long-range planning comes Youngstown Sheet & Tube Co.'s purchase of 112 acres of land near Struthers, O. Finishing facilities will be installed there some time in the future.

New Foundry for Chevrolet

Looking ahead to its 1958 models, Chevrolet Division of General Motors Corp., Detroit, will spend more than $1 million to expand foundry operations at Tonawanda, N. Y. Alton A. Way, manager of Chevvy's engine, forge and foundry plants, says the expansion won't add substantially to the foundry's capacity, but will "meet production requirements for the '58 cars, improve working conditions and enable full utilization of melting capacity."

GE Looks Ahead

Taking a long-range look at demand for consumer appliances, General Electric Co., Schenectady, N. Y., will put up a new fractional horsepower motor plant at Murfreesboro, Tenn. GE believes the appliance market will double by 1965.

GE is the prime contractor for Commonwealth Edison Co.'s Dresden nuclear power plant near Chicago. Bechtel Corp., San Francisco, engineer-constructor of the plant, has awarded construction of the 190-ft sphere to house the reactor to Chicago Bridge & Iron Co., Chicago.

Tooling for Automation

Automation prompts another new plant for Wesson Multicut Co., Detroit. The fourth expansion in two years, the facility will go up in Brighton, Mich. Purpose: To make special tools for automated lines. While automation tends to standardize products, it works the other way as far as tooling is concerned, points out the company.

Savings, Say Services, Stem from Standards

WATCH FOR more standardization of equipment and parts by the armed forces. The services have been working on their standardization program long enough to get an idea of what it can do. For example, in the first six months of this year, 129,812 items were eliminated from the supply systems. Savings: 1.5 million cu ft of space, 74,970 man-hours, $10 million. More items were eliminated in those six months than in any similar period since the program got under way about two years ago.

Who's Who

If you sell to the Defense department and are interested in what is being done to standardize your products, a good starting place is a just-published list of who among the military is responsible for standardizing what. The "Directory of Federal Supply Classification Class Assignments" is available from the Director, Cataloging, Standardization & Inspection, Room 3E784, Pentagon, Washington, D.C. Tip: It is also a handy source of information on where to start if you want to sell to the military.

Mechanical Brains Help

A companion operation to standardization is the federal cataloging program. The Defense department says it is approaching the final six months of this work. The first phase will be wound up by January. Designed to help the department keep tabs on its vast inventories and to use them better, the program depends heavily on automatic data processing equipment. Purchases of such equipment by the individual services are being screened to make sure it will integrate into the present system.

Needed: Better Figures

Few people really get hopped up over statistics. Perhaps that's one of the reasons Congress didn't allow all the money requested to round out the government's statistical program. But plans already are being made to press for action next year. Wanted are better figures on the key construction industry and on business trends. Funds were provided for a national housing inventory and for monthly estimates of retail inventories, extension of labor turnover figures and improvements in the Consumer Price Index.

More for Minerals

The Office of Defense Mobilization has authorized an additional $6 million for strategic mineral exploration. The Defense Minerals Exploration Administration now has $34 million to work with in fiscal 1957. The government will participate in 50 to 75 per cent of exploration costs.

Flood Insurance by Spring?

The federal flood insurance program is approaching the planning stages, but it will be several months before machinery will be set up to handle the operation. Top insurance people are trekking to Washington to work on it with people in government. The program is looked on now as experimental, but if it shows any signs of working it will probably be broadened.

Fair Traders Aroused

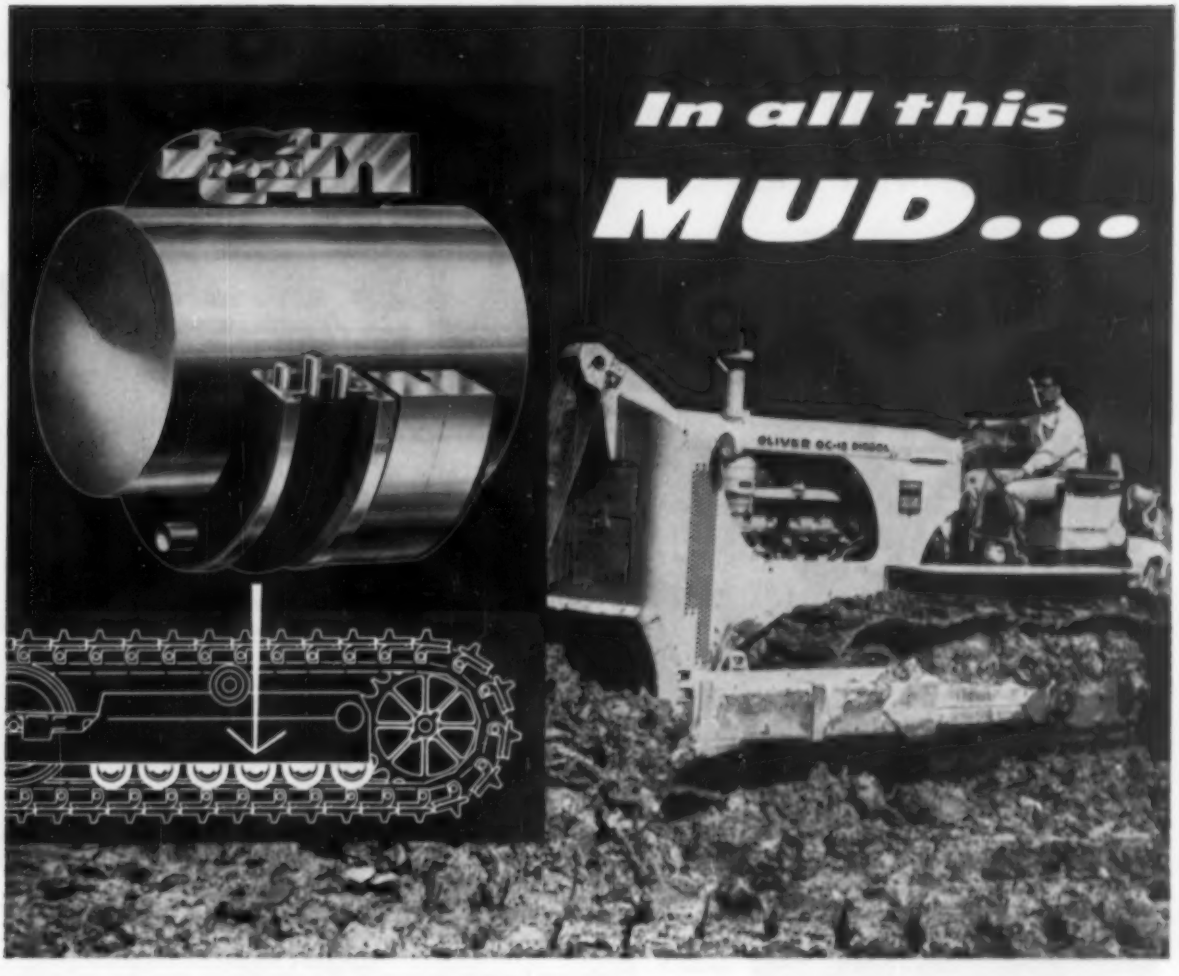
Those who favor fair trade feel it is losing out and that a stronger law is needed to make it work. A Senate Small Business Committee report states that, in general, manufacturers and retailers alike favor and intend to continue their programs, but would like to see violators made subject to fines and/or imprisonment.

A-Army Costs More

President Eisenhower has confirmed that defense costs are going up again next year in spite of talk about "reductions" in the armed forces. It is likely there will be some cutbacks in manpower, but the Defense department will justify any such action by pointing to the great increase in the power of new weapons.

Politic Surplus

Though costs of running the government may be climbing, revenue is soaring even higher. This has led to talk of a $2-billion surplus for the current fiscal year rather than the $435-million surplus predicted last January.



TRACK WHEEL BEARINGS ARE COMPLETELY PROTECTED

Whether it's tropical muck or crystal sharp Alcan dust, nothing sneaks past the C/R End Face Seals guarding the track wheels of this giant Oliver OC-18 Crawler. And here's why: The mating rings in this steel-on-steel C/R Seal are lapped flat within .000034 inch! They form a leakproof seal so dependable that even under the worst field conditions the oil and the bearings stay clean and the oil level does not require the usual frequent checking. Seal performance like this cuts downtime for lube checks . . . saves big money on round-the-clock operations. You can have equally dependable performance . . . and savings . . . with C/R Oil Seals.

C/R engineers will cooperate with you on special designs, or help select the right stock seal for a wide range of applications. Write for detailed information.

More automobiles, farm and industrial tractors rely on C/R Oil Seals than on any similar sealing device.

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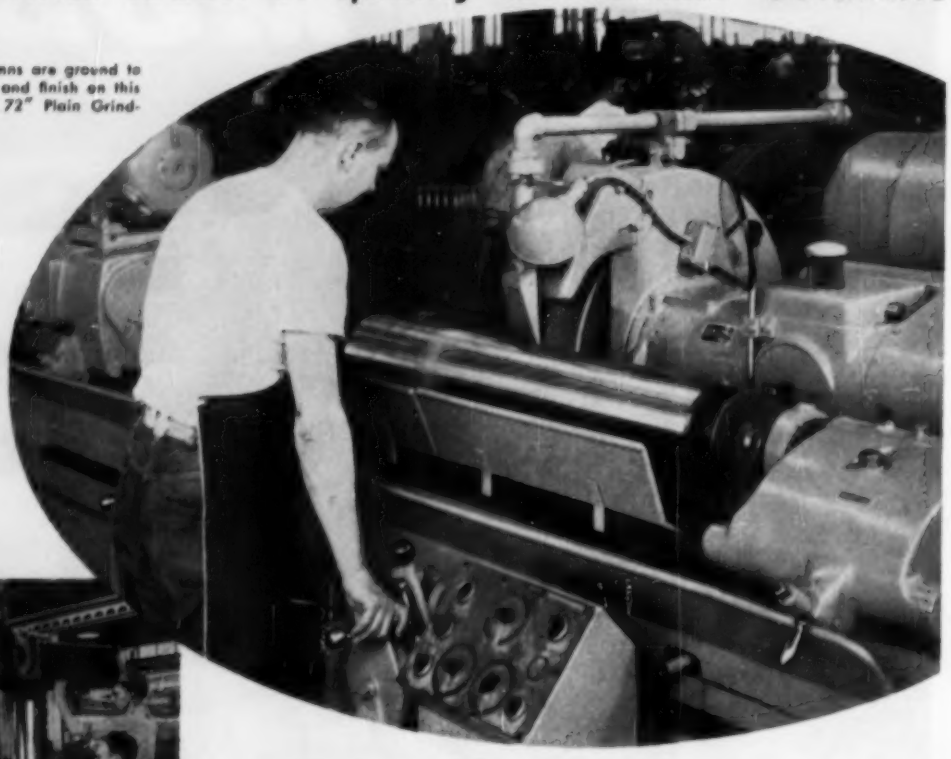
Cincinnati Filmatic 18" Plain Grinder

FILMATIC

Adds the final touch of quality to *HardClad** columns

HardClad* radial drill columns are ground to a high degree of accuracy and finish on this CINCINNATI FILMATIC 18" x 72" Plain Grinding Machine.



CINCINNATI

*Note: HardClad is the trade name for the Cincinnati Lathe and Tool Co.'s flame hardened radial drill column.

Assembling a radial drilling machine, in the plant of the Cincinnati Lathe and Tool Co.

CINCINNATI FILMATIC 18" Plain Grinding Machine

Accuracy begets accuracy. It's especially true for radial drill columns, where high-quality finish and accurate, straight sizing are basic considerations to high-quality performance. HardClad* radial drill columns, a new non-scoring development by Cincinnati Lathe and Tool Co., are ground at low cost and to the highest standards of quality on the CINCINNATI FILMATIC 18" Plain Grinder illustrated here. These machines have many advantages for quickly grinding large work to the highest quality desired:

FILMATIC grinding wheel spindle bearings . . . outlast the machine; never require adjustment

Automatic wheel balancing . . . in seconds; while the machine is running

Automatic lubrication

Electronically controlled table traverse speeds

Many additional features of high-quality, low-cost performance. Write for more information.

CINCINNATI GRINDERS INCORPORATED CINCINNATI 9, OHIO

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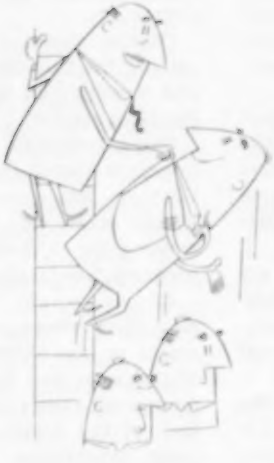
CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Management at Work



Hotpoint's Kissock Promotes from Within

TROUBLED BY the tight semi and skilled labor market today? Take a look at Hotpoint Co.'s Planned Advancement Program.

It was inspired by the basic philosophy of William A. Kissock, vice president and manager of relations and utilities, who believes that all individuals have many latent abilities. The program was set up to meet the personnel needs brought about by Hotpoint's rapid growth in the last five years. Its employment has jumped from 6000 to nearly 10,000.

Upgrading—"We try at Hotpoint," relates Mr. Kissock, "to fill all our premium paying jobs by upgrading our employees. Naturally, expansion programs accelerate the needs for skilled labor. We designed PAP to meet those requirements as well as to increase the employees' opportunities."

First step was to take an "employee inventory." After the proposed program was explained to employees, they were asked to submit data on their backgrounds: Education, hobbies, special training, special interests, etc. "The response was tremendous," says Mr. Kissock. "Over 60 per cent of the employees replied, and we followed up with personal interviews—checking qualifications and often counseling the employee on how best he could take advantage of his background and ability."

Opportunity Knocks—"Immediately, we found many opportunities to upgrade individuals with little or no additional training necessary," relates Mr. Kissock. "We set up training programs for others to equip them for better jobs. Instructors in most cases are Hotpoint employees."

When operations at the new refrigerator plant were begun in 1954, 1280 jobs were created; 85 per cent were filled by Hotpoint personnel. This, of course, opened other jobs in other plants. Result: Where possible, Hotpoint employees were upgraded to premium paying jobs. New employees started on the "ground floor."

Morale Booster—"Perhaps the most important factor in the whole program," explains Hotpoint's vp, "is its employee relations effect. Our people know we're providing all the opportunity possible for them. We fill our needs from PAP—20 to 30 employees are upgraded each month."

A native of Montreal, Canada, Bill Kissock was graduated from McGill University with a degree in metallurgy. He "fell into" industrial relations while in a training program early in his career. An incident in the department he was working in created a serious labor problem, and he was instrumental in settling it.

He joined Hotpoint in 1949. Civic affairs take up a great deal of Bill's "spare time." Pet projects are Junior Achievement and the American Council To Improve Our Neighborhoods.

How To Cut Absenteeism

To analyze your problems, you must get down to the grass roots. Chances are your foremen can give you information that puts meat on bare statistics

ABSENTEEISM dropped 28 per cent at Inland Steel Container Co., Chicago, when the firm adopted a systematic method of penalizing tardy and absent employees (see exhibit).

Installed with the full blessings of the union, the program has had two major effects, Richard S. Reichmann, plant manager, reports. It weeds out the chronic absentee, and it reduces management-union haggling.

Results—The union likes the program because it eliminates some grievance headaches. Workers like it because they hate to see a fellow employee get away with habitual tardiness or absenteeism.

A check of company records earlier this year showed that 73 per cent of the more than 400 employees had no penalty points against them. Less than 10 per cent had three or more points (primarily workers with less than two years' service).

There have been several discharges under the program, but the action has elicited no grievances from the union.

Suggestions — Mr. Reichmann thinks: 1. Such programs must meet with the union's approval, and management should seek the union's suggestions for a better program. 2. Its objectives, penalties and administration should be spelled out to the employees. 3. It must be rigid and administered impartially.

Inland Steel Container's absenteeism program is unusual. Most companies show a general lack of enthusiasm for such systematic attacks on the problem.

Foreman's Role — Management sometimes writes off absenteeism like this: "Responsible workers come to work. Those who don't are irresponsible, and that's that."

A better approach is to double check the human relations factors. Concludes a University of Michigan study: Men in work groups with lower absence rates are more satisfied with their supervision, work associates, wages and promotional opportunities, their jobs and the company in general.

The Michigan study shows that the higher the absentee rate, the less inclined workers feel toward discussing personal and job problems with their foremen. Ford Motor Co. advises supervisors to: 1. Make workers feel their jobs are important. 2. Give deserving workers recognition. 3. Listen to workers' problems and make an honest attempt to help them.

Many Causes—Of course, there are plenty of direct causes of absenteeism. Some metalworking plants in Pennsylvania and Ohio (and the practice is spreading) close for a week's vacation during the fall hunting season. Many plants close on the first day of the hunting and fishing seasons.

Baseball and football also rank high as causes for absenteeism. (An Ohio firm polls its employees before all major sporting events to learn who will be on hand.) One steelmaker stresses the fine safety record of his plants, believing that safety hazards are a potential cause. Extended week ends rank first at Chrysler Corp., Detroit.

Others: Personal problems like getting the children to the dentist and meeting the wife's mother at the train station.

Campaigns—One-shot campaigns to reduce absenteeism pay off, says Chrysler, but sooner or later the effects wear off. "We still are looking for a perfect continuing program," says the company.

Checks within your company may show absenteeism is concentrated in one or two departments. If that's so, you have no need for an over-all campaign. Take a closer look at the departments involved, their supervisors, safety records and general morale.

Notes one metalworking executive: "There's no point in reducing absenteeism if the money saved isn't worth the amount spent to do it."

Point System Cuts Absenteeism

PENALTIES

Unexcused absence	1 point
Tardiness (under 5 minutes)	½ point
Unexcused tardiness (over 5 minutes)	1 point
Wage assignment & garnishment	1 point

Statistics — You'd better forget about comparing your plant with any national or industrial average. Not enough companies grade themselves with the same techniques. Associated Industries of Cleveland found that 15 of 21 firms surveyed figured their absentee rate with this basic pattern: "Hours normally scheduled per day, week or month in each work unit or department, multiplied by the number of employees on the rolls, with no hours deducted for any reason."

Variations occurred on whether overtime should be counted in the basic figure, absences of less than a full shift, occupational accidents, absences because of a death in the family, jury duty absences, etc.

You have the same trouble when you try to define an absentee. Says one auto company: "An absentee is any person who doesn't call in to tell his boss he'll be absent." Other firms count (or don't count) as absences: Military encampment duty, holidays, vacations, quitting without notice, etc.

Positive Action — If and when your industry sets up definitions of work hours and absentee hours and member firms adhere to them, you'll be able to apply the statistical approach, and get results.

In the meantime, the best rule to follow is to get down to the grass roots. If a foreman complains that his production load is too heavy for his complement of personnel, you may have an absentee problem. If you know you're losing production units in a pattern of days, weeks or months, maybe you have too many long week enders, too many frantic fishermen or too many part-time farmers.

If you're really bothered, you could move your plant to Arizona. One report has it that this state's absentee rate is half that of Los Angeles or Chicago. There is some wisdom in this observation: It's not a bad idea to remember the absentee factor when you consider future plant sites.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

To Stock More Minerals

Stockpiles of tungsten concentrates held by the government may be increased by 1.25 million net tons as the General Services Administration starts a program to buy domestic tungsten, asbestos, fluorspar and columbium-tantalum. The Department of the Interior has transferred $21 million to GSA for the purpose. Elmer H. Weaver, commissioner, Emergency Procurement Service, says GSA and Interior are preparing regulations for the program.

CREDITS

For each year of service ..... ¼ point
(Penalty points are accumulated within a 12-month period only. The current 12-month period is Sept. 1, 1955, to Sept. 1, 1956. As the worker enters September, 1956, points accumulated against him in September, 1955, no longer count.)

PROCEDURE

1. **When a worker is penalized, he signs a penalty card.**
2. **The foreman determines whether an absence is excusable.**

THE PAY OFF

1. **Ten penalty points in 12 months means discharge.**
2. **On the eighth point, the worker is warned by his foreman.**
3. **On the ninth point, he is warned by his foreman, the union president and the personnel manager.**

Source: Inland Steel Container Co., Chicago

Sparks Atom Fleet

AEC approves Combustion Engineering for prototype reactor job at Windsor, Conn.

A THIRD major Atomic Energy Commission contractor (Combustion Engineering Inc., New York), will enter the naval reactor development program. Westinghouse Electric Corp. and General Electric Co. already are operating AEC laboratories.

Combustion Engineering will build a prototype reactor plant to power a small submarine at a laboratory to be established near Windsor, Conn.

Replica—The project will cost about $10 million. "The submarine power plant," says Joseph V. Santry, board chairman of Combustion Engineering, "will be installed in a steel replica of the submarine's hull. Navy submarine crews will be trained in the operation and maintenance of the plant."

At present, 15 nuclear powered subs have been authorized by the Navy. The success of the Nautilus (the plant ran at full power for 66 days) is giving more impetus to the drive for an all-atomic fleet.

Under Way — Construction of Combustion Engineering's Windsor lab is well under way, reports Mr. Santry. The center will include an engineering and administration building, a fuel element fabrication plant, critical assembly buildings, plus metallurgical, chemical and physical testing labs.

The firm also is fabricating heavy nuclear components for naval vessels and atomic power stations at its Chattanooga, Tenn., plant. Included is the 230-ton reactor vessel for the Shippingport station of Duquesne Light Co., Pittsburgh, the nation's first full-scale commercial nuclear power plant.

How Great Lakes Steel *blends* quality

COKE OVENS eject tons of flaming, quality controlled coke into cars for rapid delivery to quencher. Then . . .

SAMPLES ARE ANALYZED carefully to determine the amount of sulphur in the coke used in the blast furnaces.

Take five kinds of carefully selected soft coal. Blend well. Bake in a 2500° oven for 15½ hours. And if every step has been checked and double checked, the way it is at Great Lakes Steel, *presto!* You get pure, hard coke—the vital ingredient for reducing ore to high-quality pig iron.

Above, you see Great Lakes special coke recipe (cut in millionths, of course) being checked for ash impurities, a very important step in the complete analysis.

First, a sample of each kind of coal is burned to a cinder in the test furnace. Then the painstakingly mixed blend gets this dress rehearsal heat treatment, too. And this makes doubly sure that the blast furnaces produce quality iron . . . iron to make steel that meets customer specifications *to the letter!*

Quality control from raw materials to finished product—that's Great Lakes Steel! May we help you?

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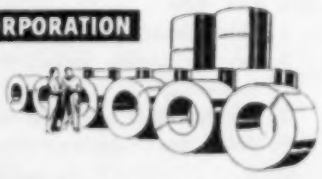
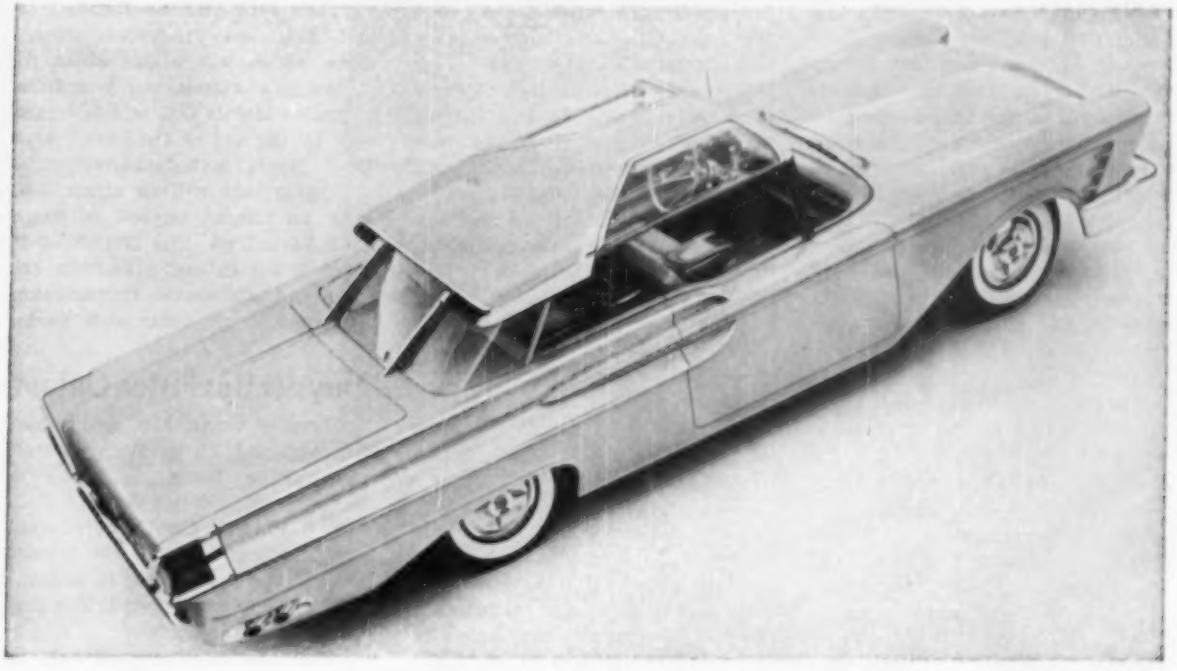
Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.



Mercury's Turnpike Cruiser sets style for its models, hints . . .

Faster, Lower Cars in '57

DETROIT is in its usual tizzy as auto makers get 1957 models ready for October and November introduction. It's estimated that $1.2 billion has been poured into tooling.

Body frames have been widened in most cases, making way for step-down interiors. The 14-in. wheel will be standard on all but the heaviest cars where braking still is a problem. Horsepower is up better than 20 per cent on the average. List prices probably will run $30 to $70 more than this year's. Ford, for example, expects a boost of about $60.

One engineer guesses that the average car will use 5 lb more aluminum, mostly in transmission covers and added trim. About the same increase is expected in stainless steel. Here are some of the rumored changes manufacturers hope will push production and sales toward the 7 million mark in 1957.

Chrysler — The smallest of the Big Three hopes to pick up 25 per cent of next year's market. All models, from Plymouth up, will sport front end torsion bar suspension and step-down interiors. Windshields and rear windows will wrap around another 4 in.

Plymouth and Dodge have lower hood lines; the rear tail fins are stretched out even more. Both have 14-in. wheels and are from 2 to 5-in. lower. Both will offer a choice of four transmissions.

Similar—De Soto and the lower priced Chryslers are getting similar treatment. They, too, have the small wheels. The pushbutton shift will be standard. Gimmicks like transistor FM radios and self-adjusting dash clocks will make their appearance on these and other makes.

Chrysler's Imperial is taking a hint from the Mark II. It's adopting the sculptured tire well in the rear deck. The roof is aluminum, formed to blend into sweeping windshields and side windows. The limousine model will be dropped.

Ford—A stylized version of the '57 Ford body is conspicuously hidden at the end of the Rouge (Dearborn, Mich.) assembly line where visitors on guided tours can get a glimpse of things to come. The biggest change appearancewise is an outward curve on tail fins. It gives the car a rocketlike effect when it is viewed from the rear.

The frame is stretched out and widened. Height is around 57 in. Engines will be revved up toward 250 hp. Fordomatic transmissions have been smoothed out. It's understood Ford may make its version of pushbutton shifting an optional feature later in the year.

Mercury — This car closely re-

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sembles the experimental Turnpike Cruiser (photo, page 61). Horsepower is up around 300; and it has pushbutton shifting; the low step-down body puts it almost on an eye level with the Thunderbird. Front and rear end chrome are taken practically line for line from the experimental car. The same is true of the concave grooves down each side.

Lincolns and Mark II's won't get much of a change. They're both slated for dual headlight units which still are illegal in some states. This problem may be circumvented by substituting fog lights for a high beam in each half of the double sets. Lincoln also will get the Y-shaped treatment on rear fins. A four-door hardtop is scheduled for this division.

GM Plans—General Motors cars retain their boxy look, but GM probably has made more engineering changes than other companies. Chevrolet and Pontiac aren't due for major change-overs until 1958. This year both will sport front and rear quarter panels with extensive facelifts and 14-in. wheels.

Pontiac has finally scraped the hump off its rear fenders. The angle of the side trim strips has been reversed. Headlight hoods are longer, and body height has dropped about 2 in. Chevvy will have a pair of pseudo air scoops on its hood a la Thunderbird.

Oldsmobile—GM's "B" body for the Olds and smaller Buicks gets a wider, longer frame which weighs about 100 lb more. The body is dropped some 3 in. Buick's transmission is supposed to have up to ten pinion gears to smooth out torque. The driveshaft is in three pieces which makes for a lower hump down the center of the floor pan. All this leads to step-down design.

The fishtail look on the Buick has given way to a square ended fender which cuts back from top to bottom. It's set off with a wide vertical band of chrome. Windshields get the usual increased wrap-around treatment and extend into the roof some 3 or 4 in. The chrome rubbing strip has been scrapped. Portholes are narrower and more oval than they were.

Top Dog—Similar framing and engineering changes are planned for standard Cadillacs, Buick Roadmasters and Supers. Ball joint front suspension will make its bow, but fuel injection is scheduled only for the Eldorado.

The mark of distinction on some of these cars will be two chrome strips which run from the rear deck over the roof. They'll split the rear window (which is swept around more) into three sections. It looks much like today's Hudson. Horsepower will be close to the 400 mark on biggest GM jobs.

Others — Minor changes are planned for American Motors' cars. Rear fenders will be slightly finned. Hudsons and Nashes have had some of their peculiar curves squared up to give a crisper appearance. The biggest change is a V-8 engine for the Rambler.

Little is known about Studebaker and Packard cars. It now definitely looks like there won't be a Packard this year although a facelifted version has been designed (See STEEL, Aug. 20, p. 87). Studebaker has scheduled a minor facelift on its Hawk series. Still uncertain: How many models will be marketed from South Bend, Ind.

Ford Starts Building

Ford Motor Co. reports construction of its aluminum casting plant near Sheffield, Ala., will start in a few days.

"The plant will be finished in mid-1957, and production operations, which will utilize about 64 million lb of aluminum a year from Reynolds Metals Co., will be under way by the end of the year," says D. J. Davis, manufacturing vp.

Employment will be about 800, with an annual payroll of more than $4 million. The 200,000-sq-ft plant is set to cast aluminum engine and automatic transmission components and other auto parts.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804†	659,763
7 Mo. Total	3,641,291†	4,916,917
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
July 21	113,416	196,434
July 28	111,247	161,370
Aug. 4	111,152	140,788
Aug. 11	108,155	149,199
Aug. 18	99,739†	138,209
Aug. 25	76,000*	129,591

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Chrysler Ups Piston Output

Chrysler Corp. has modernized its Highland Park, Mich., aluminum piston foundry. Production has increased 50 per cent.

T. R. Patrick, plant general manager, reports that 75,000 pistons of one type now can be turned out in a 24-hour work period. The previous rate was 52,000.

"The new facilities will help us supply 75 per cent of the pistons for Plymouth and Dodge V-8 engines; 100 per cent of the pistons for Plymouth 6-cylinder and for De Soto and Chrysler V-8 engines," claims Mr. Patrick.

Sixteen automatic permanent casting machines and eight dry-hearth combination melting and holding furnaces were installed. Each furnace can melt 900 lb of aluminum an hour.

Exhaust Notes

• George Romney, AMC president, reports the company lost $7.9 million in the nine months ended June 30, after selling $10.6 million of its holding in a subsidiary company. Last year, AMC also had a net loss of $4.5 million after a tax recovery of $4.7 million.

• Chrysler and Imperial car deliveries reached 4330 units in the first ten days of August. Deliveries were up 9.2 per cent over the previous ten-day period, 9.9 per cent higher than a year ago.

• Ford Motor Co. has borrowed $250 million from insurance groups and other underwriters to finance expansion programs. Part of the money may go to pay the costs of bringing out its E model car in 1957.

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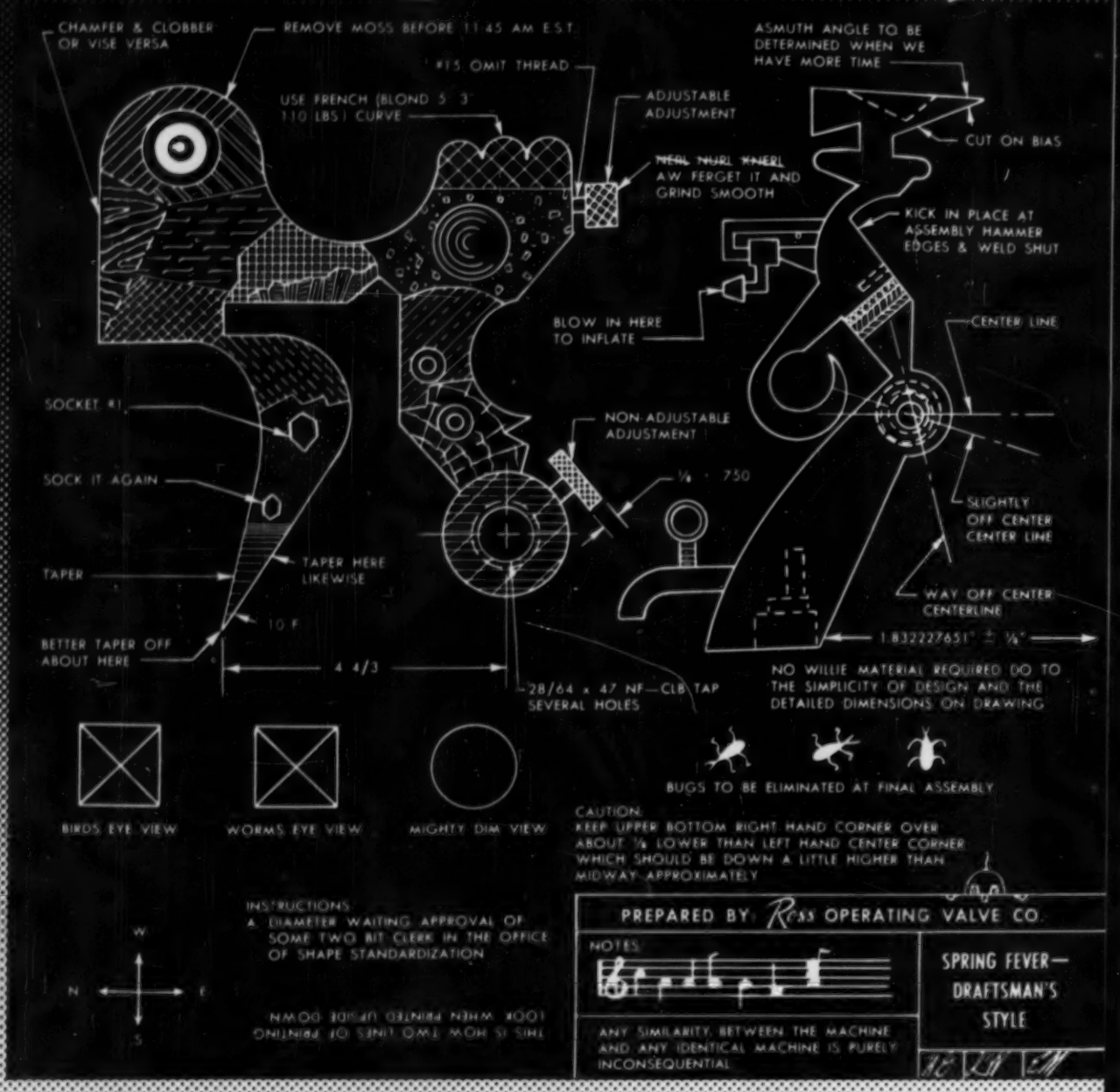
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REMOVE MOSS BEFORE 11:45 AM E.S.T.
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USE FRENCH (BLOND 5' 3" 110 LBS.) CURVE
ADJUSTABLE ADJUSTMENT
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AZIMUTH ANGLE TO BE DETERMINED WHEN WE HAVE MORE TIME
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BETTER TAPER OFF ABOUT HERE
10 F
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28/64 x 47 NF—CLB TAP SEVERAL HOLES
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BUGS TO BE ELIMINATED AT FINAL ASSEMBLY
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CAUTION:
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INSTRUCTIONS:
A DIAMETER WAITING APPROVAL OF SOME TWO BIT CLERK IN THE OFFICE OF SHAPE STANDARDIZATION
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THIS IS HOW TWO LINES OF PRINTING LOOK WHEN PRINTED UPSIDE DOWN
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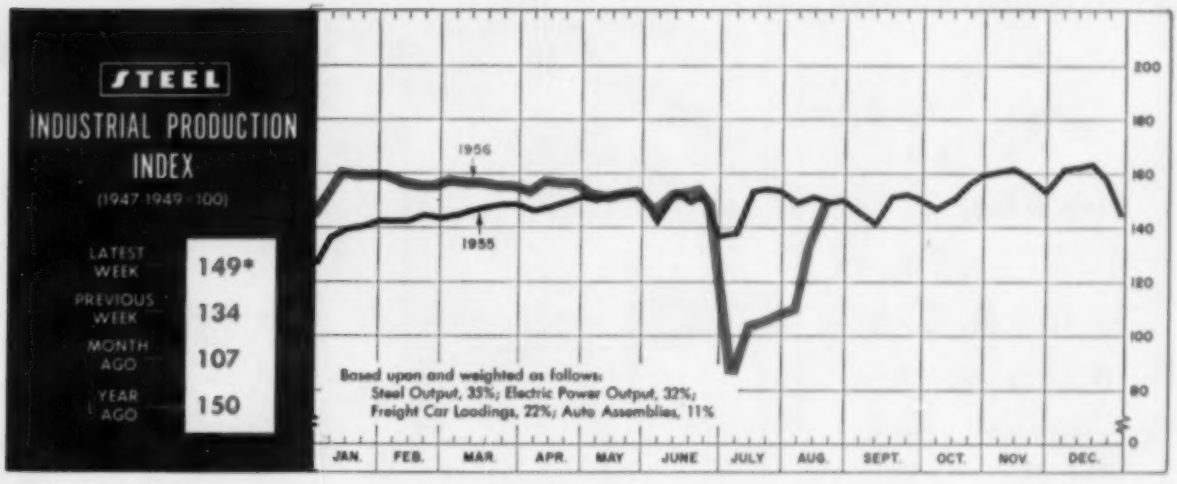

*Week ended Aug. 18

Underlying Strength Supports Production

LOOKING at totals, you might conclude that industrial production declined during strike-bound July (see chart above and the one on page 66). You come up with a different answer when you break down the figures by types of production and by geographical areas. Our economy has exhibited great underlying strength since the second half of last year.

The most obvious fact is that practically all declines in June and July can be laid at the doorstep of the steel industry. The Federal Reserve Board of Governors says that its index slid from 141 in June to 136 in July (1947-1949 =100). Primary metals fell to nearly half the June figure (from 135 to 72), but practically all other types of production showed seasonally adjusted gains. This characteristic was strongest in the durable goods industries. Even the automotive industry gained in July. It leads one to wonder what total production would have been had the steel industry operated normally during the month.

Nationwide—This basic strength is shared by all sections of the nation. In fact, the farther west you go, the less you will find the fluctuations which characterized business as a whole during the first six months of this year. The business index of the Security-First National Bank of Los Angeles registered three gains in a row (April, May and June), while the FRB index showed a 2 point drop. Even the steel strike will have less of an effect in that district than in the Midwest and East. Kaiser Steel Corp., one of the major west coast producers, operated above capacity during the strike.

In neighboring Arizona, manufacturing jobs were climbing to an all-time high in the first half. Manufacturing output is running at a record annual rate of nearly $400 million in this young industrial state. In Montana, July nonagricultural employment rose to within 800 of the all-time record, with the peak in August still to come.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,340[1]	2,154	2,186
Electric Power Distributed (million kw-hr)	11,550[1]	11,530	10,812
Bituminous Coal Output (1000 tons)	9,525[1]	9,240	9,233
Petroleum Production (daily avg—1000 bbl)	7,070[1]	7,086	6,635
Construction Volume (*ENR*—millions)	$258.1	$322.8	$322.2
Auto, Truck Output, U. S., Canada (*Ward's*)	127,622[1]	133,245	165,091
TRADE			
Freight Car Loadings (1000 cars)	730[1]	715	781
Business Failures (Dun & Bradstreet)	229	282	169
Currency in Circulation (millions)[3]	$30,681	$30,633	$30,336
Dept. Store Sales (changes from year ago)[3]	+7%	+7%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,807	$19,493	$19,707
Federal Gross Debt (billions)	$272.4	$272.5	$277.2
Bond Volume, NYSE (millions)	$17.1	$17.1	$16.7
Stocks Sales, NYSE (thousands of shares)	9,030	11,540	7,274
Loans and Investments (billions)[4]	$84.4	$84.6	$84.4
U. S. Govt. Obligations Held (billions)[4]	$25.8	$26.0	$31.6
PRICES			
STEEL's Finished Steel Price Index[5]	225.71	225.71	207.63
STEEL's Nonferrous Metal Price Index[6]	261.8	261.7	240.7
All Commodities[7]	114.5	114.2	110.3
Commodities Other Than Farm & Foods[7]	122.3	121.9	116.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

Says "Dependable Dan"—

See what FORTUNE says in the DSC ad in this issue

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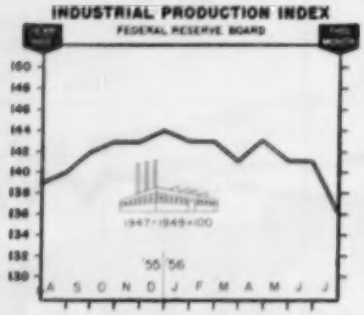
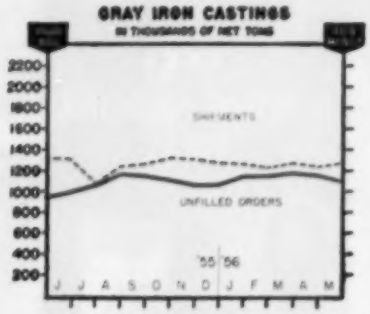
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production 1956	Total Production 1955	Primary Metals 1956	Primary Metals 1955	Metal Fabricating 1956	Metal Fabricating 1955
Jan.	143	132	148	127	170	157
Feb.	143	133	148	131	168	157
Mar.	141	135	145	136	166	160
Apr.	143	136	145	138	171	160
May	141	138	141	140	167	163
June	141	139	135	143	166	164
July	136*	139	72*	134	171*	166
Aug.	...	140	...	139	...	170
Sept.	...	142	...	146	...	171
Oct.	...	143	...	148	...	172
Nov.	...	143	...	149	...	172
Dec.	...	144	...	151	...	172
Avg.	...	138	...	140	...	165

Federal Reserve Board. *Preliminary.
Charts copyrighted, 1956, STEEL.

	Shipments 1956	Shipments 1955	Unfilled Orders* 1956	Unfilled Orders* 1955
Jan.	1,250	1,002	1,158	782
Feb.	1,215	1,106	1,141	852
Mar.	1,255	1,315	1,163	842
Apr.	1,218	1,294	1,145	964
May	1,248	1,310	1,086	938
June	...	1,296	....	982
July	...	1,070	....	1,050
Aug.	...	1,226	....	1,160
Sept.	...	1,253	....	1,151
Oct.	...	1,310	....	1,113
Nov.	...	1,306	....	1,062
Dec.	...	1,260	....	1,075
Total	...	14,838		

*For sale. U. S. Bureau of the Census.

Industrial Shift—The shift from an agrarian to an industrial economy in the South is evident in the output of electrical energy. Both the southeast and south central regions are running equal to or ahead of the national year-to-year gains, according to Edison Electric Institute. This was especially noticeable during the steel strike and is partly accounted for by warmer weather and more air conditioners. But the trend is too consistent to be written off as a seasonal fluctuation.

Department store sales show that practically all sections of the country are sharing in the unprecedented prosperity. National sales to date are 4 per cent ahead of record 1955's. Every Federal Reserve District is posting plus figures. While this is not a direct indicator of industrial activity, it still measures confidence in business. All districts also show year-to-year gains for wholesale sales, especially of durable goods.

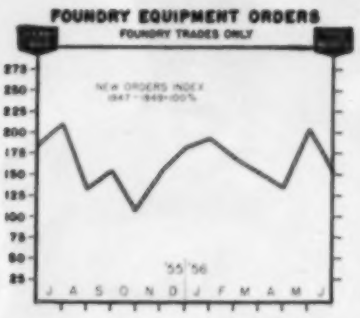
There are notable, though few, exceptions to the rule. Detroit has been hard hit by the auto slump, yet merchants in the motor capital will tell you business is still good. Areas like Pittsburgh, where steel is king, were slowed down by the strike. But, again, the recovery has been fast.

New Gains Coming—If this underlying strength continues—and there is belief it will—it could boost the fourth quarter to a new production high. One market research specialist told STEEL the FRB index for the fourth quarter will average 145. The record of 144 was set last December.

Foundries Hold Steady

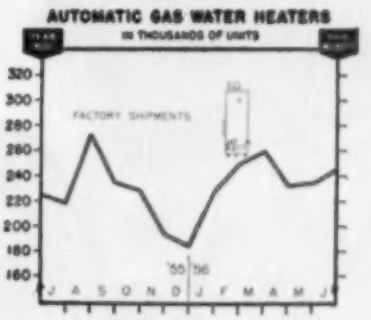
The foundry industry is holding at the first half level, which is only slightly shy of the late 1955 mark. Gray iron casters operated at a practically constant rate during the early part of the year (see chart above) and have continued that way right through the steel strike. An upturn is expected in September when the automotive industry and farm machinery manufacturers boost production. Unfilled orders will probably fall beneath the 1 million ton mark for the first time since June, 1956.

Makers of foundry equipment are being kept busy. While orders for new equipment dipped from the year's high point in June (chart, page 69), the monthly average for the first half was 168.4, com-



	1956	1955	1954
Jan.	195.6	81.0	173.8
Feb.	169.0	90.4	99.9
Mar.	152.7	163.6	82.7
Apr.	135.2	178.6	128.3
May	207.0	145.7	80.8
June	196.7	186.8	86.4
July	....	213.4	68.8
Aug.	....	134.0	75.6
Sept.	....	186.7	68.3
Oct.	....	168.6	147.5
Nov.	....	154.4	61.4
Dec.	....	163.9	113.9

Foundry Equipment Mfrs. Assn.



	Shipments—Units		
	1956	1955	1954
Jan.	220,200	210,900	164,400
Feb.	251,900	228,400	175,900
Mar.	260,400	263,100	187,800
Apr.	235,500	245,700	200,400
May	236,800	229,400	195,600
June	242,300	227,100	206,700
July	253,300*	219,300	199,300
Aug.	.....	275,600	207,100
Sept.	.....	237,100	205,500
Oct.	.....	231,200	202,900
Nov.	.....	195,500	179,100
Dec.	.....	185,400	166,800
Totals	.....	2,748,200	2,281,100

*Preliminary.
Gas Appliance Mfrs. Assn.

pared with 149.8 for 1955 (1947-1949=100). It was expected that the enthusiasm for new equipment generated at the May foundry show might carry over into July, but some men in industry feel that the uncertainty preceding the strike may have postponed some buying plans. They say there is nothing seriously wrong with either the foundry or foundry equipment business.

Incorporations, 8 to 1

Business incorporations in July declined for the second month in a row, following a seasonal pattern. At 11,513, the total still is greater than it was in any month in 1953, 11 months in 1954 and six months in 1955. The first seven months of 1956 are 2520 incorporations ahead of the corresponding period of 1955. New York and California continue to be the states most preferred for new businesses, according to Dun & Bradstreet Inc.'s figures.

Businesses continue to "go under" at a near record rate, but the business community is still growing by leaps and bounds. Failures during the first seven months of the year fell just short of the 8000 mark, leaving the ratio of incorporations to failures at about 8 to 1.

Index Regains Losses

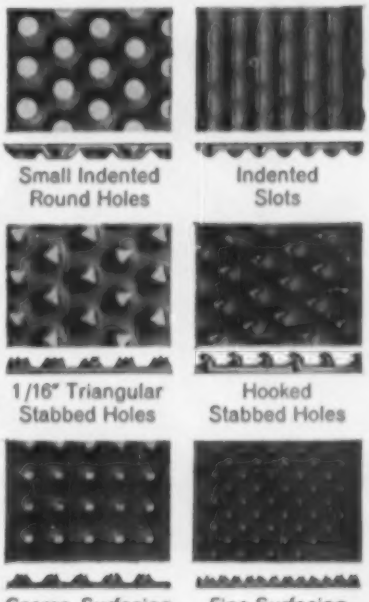
STEEL's industrial production index has all but recovered the ground it lost during the strike. The week ended Aug. 18 registered a preliminary 149 per cent of the 1947-1949 average. The last week to be unaffected by the strike (June 23) read 155 on the scale. With steel operations scheduled to hit 95.5 per cent of capacity (2,340,000 tons) last week, the index had a chance to make up more lost ground. But the decline in auto production rules that out. By the end of this week, all producers except General Motors Corp. will be shut down for model change-overs. Only Lincoln Division of Ford Motor Co. will be producing 1957s before the end of August.

Freight car loadings also are hamstringing the index. The ore boat strike is the main reason they have not come up to first-half levels. The index will not climb much above the 150 mark until this strike is over and auto production hits its stride again—probably in late September.

H&K

SURFACED PERFORATIONS

are used in many products



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If your product requires surfaced perforated materials, contact either H & K office or one of our agents. We will be glad to work with you on your perforating requirements.

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- ☐ STOCK LIST of Perforated Steel Sheets
- ☐ SAMPLES of Perforated Plastics and Paper
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COMPANY_____

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Hardtem Die Blocks are forged to obtain optimum structure from a special Heppenstall alloy steel—hardened and tempered until the correct physical properties are obtained. They must be uniform in hardness . . . able to hold closer tolerances and provide longer-lasting impressions.

Then they're shipped to you to afford the maximum wear, heat, and shock resistance demanded for your finest workmanship.

You can trust Hardtem's top performance — for its quality is under constant study and development by both Heppenstall's engineering and research staffs.

Make Heppenstall your standard die block specification.

HEPPENSTALL

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PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

WILLIAM B. MILLS
. . . heads N. Y. Air Brake Divs. sales

G. H. DeKAY JR.
. . . Calif. Steel Products sales-v. p.

D. G. AYMES
. . . heads Capitol mill products

William B. Mills was made general sales manager of New York Air Brake Co.'s new **Vacuum Equipment Division**, Philadelphia, and **Kinney Mfg. Division**, Boston. He was sales manager of Kinney and will direct combined sales operations from headquarters in Boston. Vacuum Equipment was formed following acquisition of Optical Film Engineering Co., Philadelphia.

Seneca Falls Machine Co., Seneca Falls, N. Y., appointed **V. L. Percy** chief engineer; **R. M. Wheeler**, executive assistant; and **T. E. Rodgers**, works manager.

Waldemar Naujoks joined **Kropp Forge Co.**, Chicago, as manager of engineering. He has recently served as section chief, forging and casting section, in Washington. He previously was vice president-general manager, Globe Forge Inc.

Chester P. Coldren, effective Sept. 1, was made manager of research and development, **Reliance Division**, Eaton Mfg. Co., at Massillon, O. He will replace **R. F. Golden**, who is retiring.

William R. Mogg was made special products sales manager, **Cleveland Graphite Bronze Co.**, Cleveland. He is primarily concerned with marketing of electroformed copper foil.

G. H. DeKay Jr. was elected vice president-sales, **California Steel Products Division**, Adsco Industries Inc., Richmond, Calif. He was sales manager.

Alfred A. Smith was appointed manager, metal lath division, **Penn Metal Co.**, at Parkersburg, W. Va. He was with U. S. Gypsum Co.

Harry L. Warner was made sales manager for **Kaiser Steel Corp.'s** Fontana, Calif., fabricating division.

John J. Littley was made sales manager, hydraulic and compacting presses, for **Baldwin-Lima-Hamilton Corp.'s**, Hamilton, O., division. **Byron B. Belden** will serve as application engineer for Baldwin compacting presses.

George H. Rehling was elected a vice president, **Wyckoff Steel Co.**, Dayton, O.

Byron Snow was made manager, original equipment sales, ball and bearing division, **Hoover Ball & Bearing Co.** and subsidiaries, Ann Arbor, Mich. He was with Aeroquip Corp.

William P. Youngquist joined **Vulcan Crucible Steel Division**, Aliquippa, Pa., H. K. Porter Company Inc., in a general administrative capacity relating to production and sales.

D. G. Aymes was made general manager, mill products division, **Capitol Products Corp.**, Mechanicsburg, Pa. He was sales manager, industrial division, R. D. Werner Inc.

Judge Daniel A. Covelli was elected executive vice president and treasurer of **Orton Crane & Shovel Co.**, Chicago.

A. King McCord was elected president, **Westinghouse Air Brake Co.**, Wilmerding, Pa., to succeed **E. O. Boshell** who remains chairman. Mr. McCord, formerly president of Oliver Corp., assumes his new duties as president and chief executive officer Sept. 1.

Marlin R. Hemphill was made general manager, forging and casting division, **Allegheny Ludlum Steel Corp.**, at Ferndale, Mich. The late **T. A. Moormann** was plant manager. Mr. Hemphill continues as general manager, Carmet Division, at Ferndale.

Gary A. May, effective Sept. 1, will be general manager of **Chicago Pneumatic Tool Co.'s** oil tool division, Ft. Worth, Tex.

Air Products Inc., Allentown, Pa., transferred **George W. Bretz**, assistant vice president, to the West Coast to assume the administrative duties of **Carl R. Anderson**, vice president. Mr. Anderson re-

W. W. SEBALD

RALPH L. GRAY

. . . executive changes at Armco

turns to Allentown to head up the newly created construction and service division.

Donald W. Walker was made foil product manager for **Kaiser Aluminum & Chemical Sales Inc.**, Chicago. He is succeeded as pig and ingot product manager by **A. V. Lorch.**

David H. Brown was elected president and general manager, **New Process Gear Corp.**, Syracuse, N. Y. He succeeds **Joseph F. Kerigan**, resigned.

John D. Campbell and **James W. Kerr** were elected vice presidents of **Canadian Westinghouse Co. Ltd.**, Hamilton, Ont.

Chain Belt Co., Milwaukee, announces organizational changes, effective Sept. 1. Two sections (industrial equipment and construction machinery) are being established. **W. J. Sparling**, now vice president - Milwaukee operations, will become vice president-manufacturing and industrial equipment. **O. W. Carpenter**, vice president-finance, will be vice president-construction machinery and finance. **E. M. Rhodes** will fill the new post of manager of chain operations and is replaced as manager, roller chain division, by **J. D. Sloan. A. K. Thomas** will be assistant to the vice president-construction machinery and is replaced as manager, construction machinery division, by **W. C. Messinger.**

W. W. Sebald has resigned as president of **Armco Steel Corp.**, Middletown, O., to become vice chairman of the board and chairman of the executive committee. **Ralph L. Gray**, executive vice president, was elected president.

Robert C. Smith succeeds **John H. Gilbert**, who retires Sept. 1 as treasurer, **Chase Brass & Copper Co.**, Waterbury, Conn., subsidiary of Kennecott Copper Corp.

Joseph A. Brust was made chief engineer of **Efficient Engineering Co. Inc.**, Detroit. He was vice president-general manager, Pioneer Engineering & Mfg. Co. of Virginia Inc.

Joseph Foster was made manager of **Brush Electronics Co.'s** market research department. Before joining Brush, a division of Clevite Corp., he was a market analyst for Harris-Seybold Co.

Waid V. Clark, secretary - controller, **Thew Shovel Co.**, Lorain, O., assumes the additional duties as treasurer, a position formerly held by C. B. Smythe, president of the firm.

C. B. Pharo Jr. was made assistant district sales manager of **Republic Steel Corp.'s** Birmingham district, effective Sept. 1. He was assistant sales manager of the company's bar division.

James E. Good was made field sales manager, **Atkins Saw Division**, Borg-Warner Corp., Indianapolis. He was manager of the Chicago district for J. H. Williams Co.

Charles L. Shanholtzer was made sales manager, steel-pride products, sheet metal division, **Follansbee Steel Corp.**, Follansbee, W. Va. He was in the sales department of Lyon Metal Products Inc.

Joseph D. Gavin was made manager, sheet and strip order department, at **Joseph T. Ryerson & Son Inc.**, Chicago.

W. W. Holloway Jr. was promoted to superintendent, tube mills, at **Wheeling Steel Corp.'s** Benwood, W. Va., Works.

Frank N. Moesta was made works auditor of **Mesta Machine Co.'s** New Castle, Pa., plant.

Micrometrical Mfg. Co., Ann Arbor, Mich., elected **Fritz A. Zander** executive vice president and **Frank W. Kabat**, director of sales.

Paul M. Corp was elected president of **Alliance Ware Inc.**, Alliance, O. He is a vice president of the parent firm, American Metal Products Co.

John P. Walsh was made sales engineer, **Pittsburgh Engineering Co.**, Glassport, Pa., division of Pittsburgh Steel Foundry Corp. He was with Morgan Engineering Co.

Edward H. Flesinger Jr. was made superintendent of **Crouse-Hinds Co.'s** iron foundry, Syracuse, N. Y.

Harold H. Gillespie was made assistant general manager, **Barden Corp.**, Danbury, Conn.

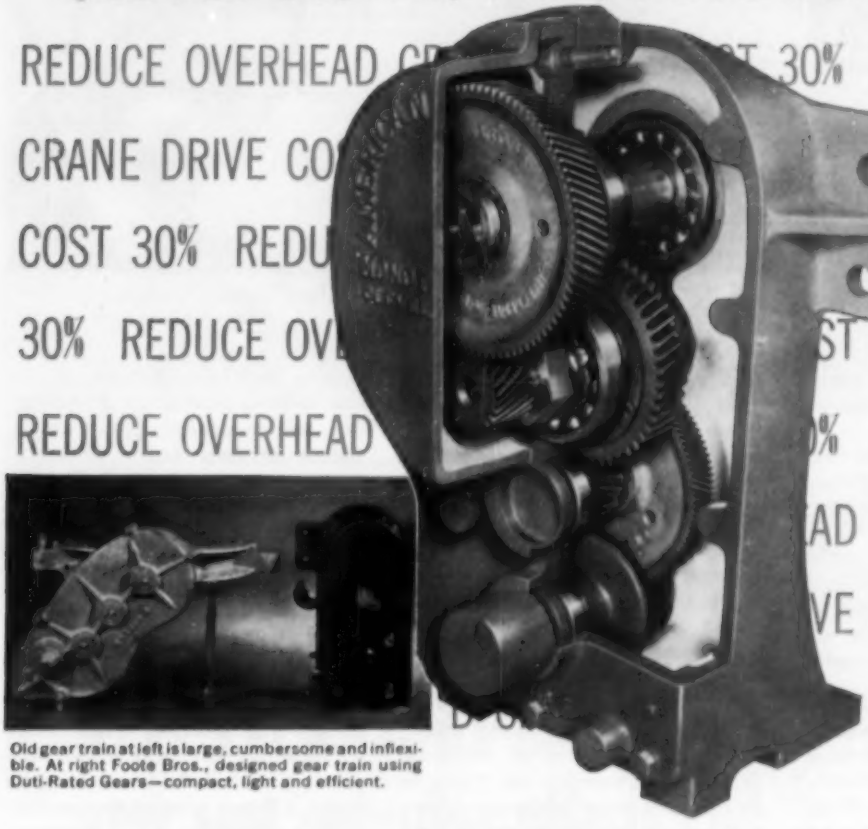
Roy Cranz was made chief engineer, **Marble Steel & Aluminum Co.**, Santa Monica, Calif.

A. J. Hendry was made sales manager of **Westinghouse Electric Corp.'s** standard control division, Beaver, Pa. He succeeds the late **Frank H. Clark.** Mr. Hendry was sales manager of the welding department, motor and control division, Buffalo.

John F. Blamy was made chief inspector, **Pontiac Motor Division**, General Motors Corp., Pontiac,

Dutl-Rated Lifetime Gears

REDUCE OVERHEAD CRANE DRIVE COST 30%



Old gear train at left is large, cumbersome and inflexible. At right Foote Bros., designed gear train using Duti-Rated Gears—compact, light and efficient.

100% more capacity - 25% less weight - 28% less size

Ordinary commercial gearing in the traversing drive for an overhead, traveling crane system was bulky and had to be set at a space wasting 45° angle to save head room. Foote Bros. designed a special transmission system using Lifetime Duti-Rated Gears, permitting the application of smaller gears for the same capacity, allowing shorter center distances and a much more compactly designed drive.

The savings in space not only improved the design and performance of the overhead crane but also life expectancy. Maintenance requirements were greatly reduced. An outstanding feature of the new drive was that the Duti-Rated Gears could be interchanged on the same centers to change the ratios . . . allowing various speeds, fast and slow, for traversing.

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THEODORE T. PECK
. . . Chicago Vitreous v. p.

FRED J. FLEISCHAUER
. . . chief design engineer for Teller

JAMES J. DUNLEAVY
. . . directs Fyr-Fyter divisions

Mich. He succeeds **W. H. Vann**, who becomes quality co-ordinator.

Theodore T. Peck was elected vice president, **Chicago Vitreous Corp.**, Cicero, Ill. He continues as secretary.

L. Deane Hall was made general manager of **Ralph C. Coxhead Corp.**, Newark, N. J., recently acquired as a subsidiary of Addressograph-Multigraph Corp.

E. L. Treppa was made New England district manager of **Mueller Brass Co.** He is at Cambridge, Mass. **Vincent A. Bower** was made Dallas district manager; and **George I. Duddy**, New Orleans district manager.

Fred J. Fleischauer was appointed chief design engineer, special machinery division, **Teller Co.**, Butler, Pa. The division is concerned with industrial automation and plant mechanization.

James G. Graham, former eastern regional manager-railroad sales, **Fairbanks, Morse & Co.**, was transferred to Chicago to become general manager of railroad sales. **Gordon Anderson Jr.**, formerly assistant to the co-ordinator of governmental business, was transferred to the office of the vice president-engineering at Chicago as assistant chief engineer. He is replaced by **William B. Morse**, who was assistant to the chief engineer of the company.

Pyrene C-O-Two, Newark, N. J., has been acquired by Fyr-Fyter Co., and is operating as two divisions of that firm. **James J. Dunleavy** is vice president-general manager; **C. S. Duncan**, vice president-assistant general manager. **W. E. Tromanhauser** was made vice president-sales manager of the new C-O-Two Portable Division; **C. T. DuBreuil**, vice president-manager of the new C-O-Two Systems Division.

Warren H. McMullen was made metallurgist in charge of development, technical field and sales in the flux department of **Hanson-Van Winkle - Munning Co.**, Matawan, N. J. **Allen T. Baldwin**, manager, flux sales department, retired.

OBITUARIES . . .

Fredrick W. Wagner, 41, vice president, **Wagner Bros. Inc.**, died Aug. 3.

Henry A. Saller, assistant technical director at **Battelle Memorial Institute**, Columbus, O., died Aug. 14.

Joseph P. Manypenny, president, **Joseph P. Manypenny Co.**, Philadelphia, died Aug. 6.

Roger J. Jeffries, 62, founder of **Jeffries Engineering & Mfg. Corp.**, San Diego, Calif., died Aug. 8.

Victor A. Spoehr, 59, former vice president-general manager, **H. M. Harper Co.**, Morton Grove, Ill., died Aug. 8.

Hugh L. Adams, 74, a founder and retired vice president, **Edward G. Budd Mfg. Co.**, Philadelphia, died Aug. 6 in New York.

Julius T. Wachs, 74, former secretary - treasurer, **Sturdy - Built Equipment Corp.**, Milwaukee, died Aug. 10.

Milton J. Rice, 54, vice president-engineering, **Whiting Corp.**, Harvey, Ill., died Aug. 11.

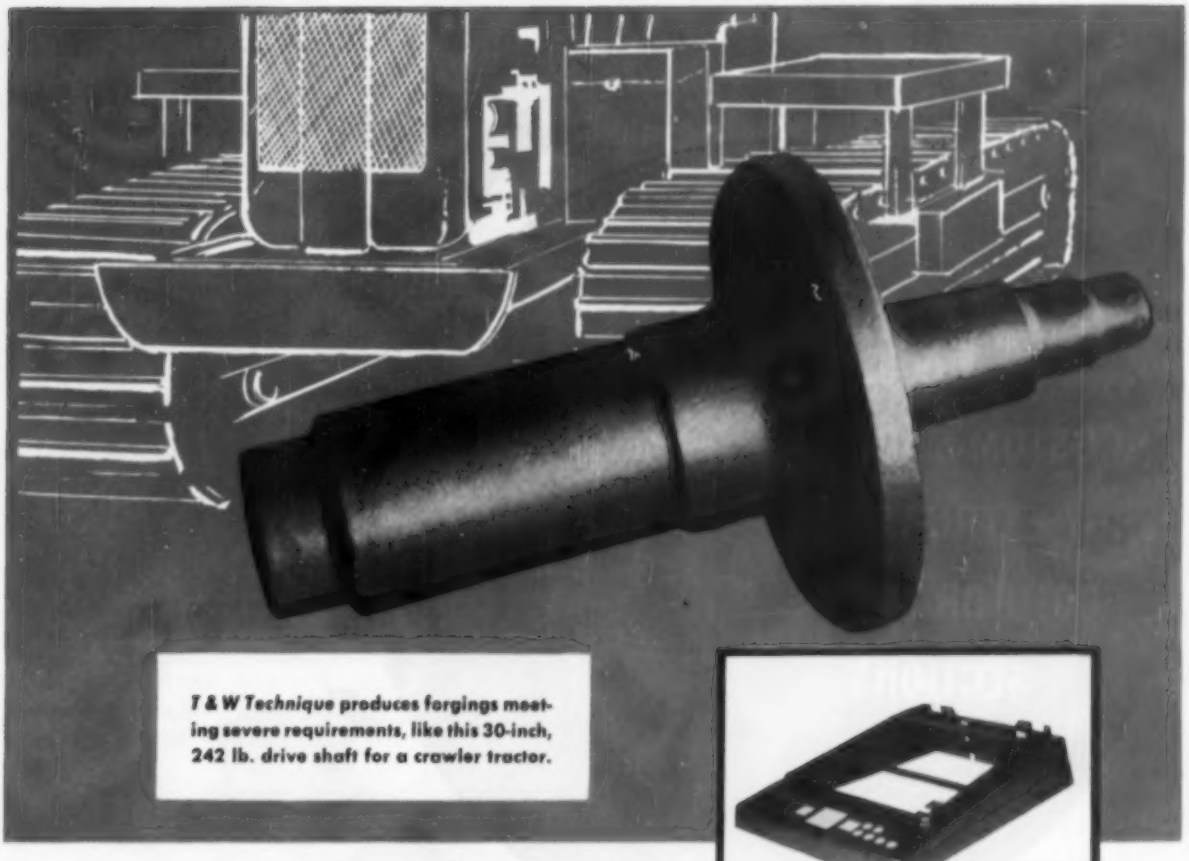
Homer R. Mitchell, 83, chairman, **Buckeye Tools Corp.**, Dayton, O., died Aug. 6.

Charles E. Woodell, 72, former manager-research and development, **Carborundum Co.**, Niagara Falls, N. Y., died Aug. 4 in Phoenix, Ariz.

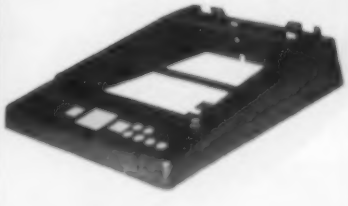
Benjamin J. Taylor, 47, quality manager in the production department of **Ohio Crankshaft Co.**, Cleveland, died Aug. 12.

Albert P. Schraner, 81, founder and president, **A. P. Schraner Pattern Co.**, Cleveland, died Aug. 12.

Earl V. Farrar, 53, chief engineer, **Wright Aeronautical Division**, Curtiss-Wright Corp., Wood-Ridge, N. J., died Aug. 11.



T & W Technique produces forgings meeting severe requirements, like this 30-inch, 242 lb. drive shaft for a crawler tractor.



This radar unit base, deep drawn from 16 gage steel, 7" x 18" x 24", is an example of what *T & W Technique* can accomplish in stampings.

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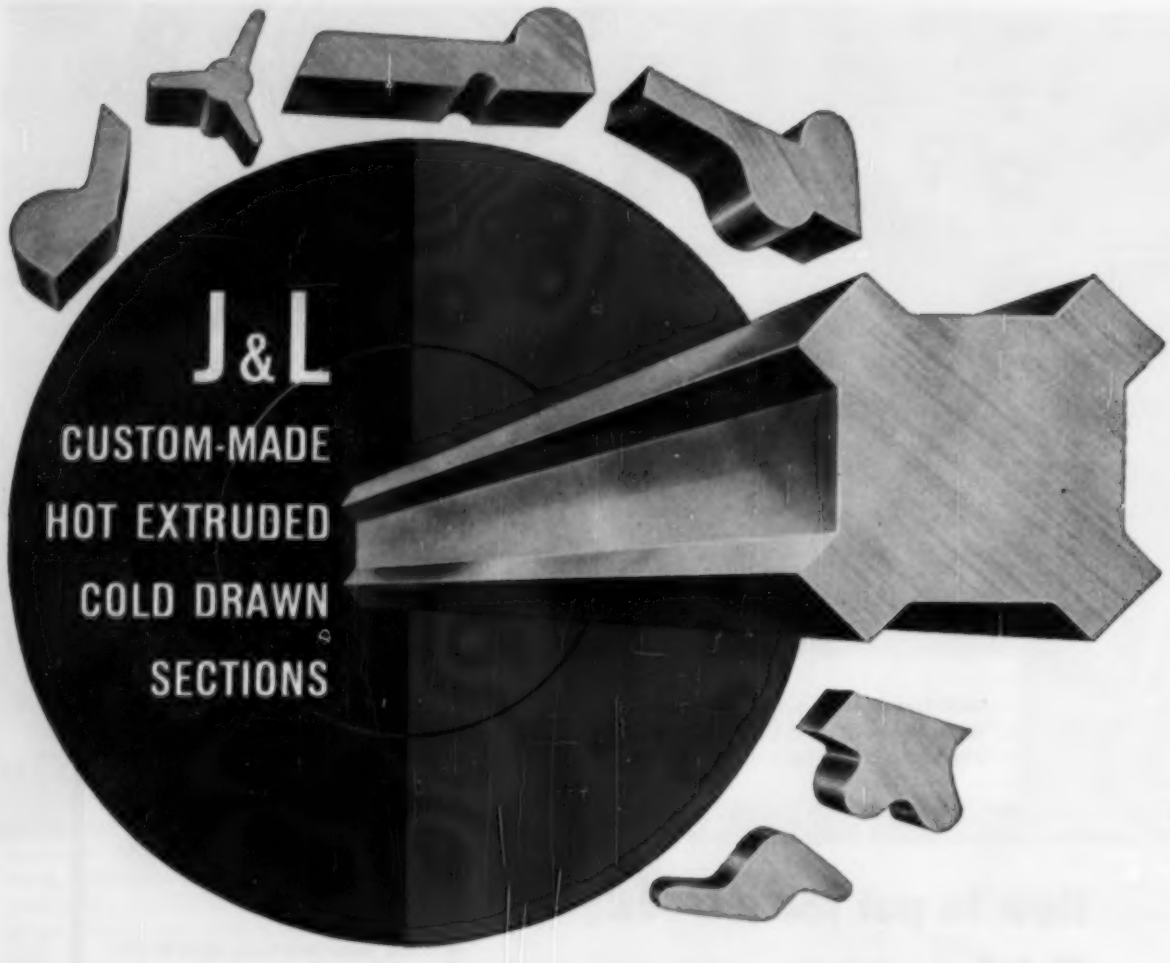

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Hammond Gets Plant

American Can selects Indiana site for plate processing facilities. It's part of expansion plan

AMERICAN CAN CO., New York, will build a tin plate and black plate processing plant at Hammond, Ind. It is part of a two-year, $27-million project.

The program calls for the installation of large scale processing facilities in the company's plants to utilize tin and steel plate in continuous strips as a first step "in combating rising plate prices" (STEEL, June 18, p. 99). New facilities will include machinery for unrolling coils, inspecting and shearing plate, sorting and stacking sheets.

Goal Is High—Within two years, William C. Stolk, president, said recently, American Can will be processing between 75 and 85 per cent of its tin plate and black plate requirements.

The Hammond plant will be the largest of the company's facilities for processing plate from continuous strips, says L. W. Graaskamp, vice president in charge of the firm's Central Division. It will contain about 325,000 sq ft of floor space and is scheduled for completion next spring.

American Can has started work on plate processing facilities at its plants in Maywood and Oakland, Calif. Additional ones are planned for Hillside, N. J., Tampa, Fla., New York, Baltimore and a number of other areas.

Mesta To Build Cold Mill

Mesta Machine Co., Pittsburgh, was awarded a contract covering the design and manufacture of a 48-in., 5-stand tandem, 4-high cold mill. The installation will be made at Bethlehem Steel Co.'s Sparrows Point, Md., plant. The mill will be designed for cold reducing hot rolled and pickled steel strip to a maximum width of 44 in. Thicknesses will range from 0.065 to 0.125 in. for reduction to tin plate gages.

The mill will be geared for a maximum speed of 6000 fpm, with an average operating speed of about 4800 fpm. Horsepower will be 21,150. The equipment will include: A 60-ft entry conveyor; a 20-ft delivery conveyor; and coil handling equipment suitable for coils about 73 in. in diameter, weighing about 1000 lb per inch of width.

Carborundum Expands

Carborundum Co. awarded a general contract for $300,000 expansion of its furnace mill in Vancouver, B. C., to Donald M. Drake Co., Portland, Oreg. Plans call for addition of five furnaces and an electric transformer house.

Will Erect Auto Wheel Plant

Kelsey-Hayes Wheel Co., Detroit, will build a plant at Falsington, Pa., for the manufacture of passenger car wheels.

Will Double Coupling Output

Construction is under way on an addition to Ajax Flexible Coupling Co. Inc.'s plant at Westfield, N. Y. It will practically double the output of couplings and other products.

Plans Structural Steel Mill

Dominion Structural Steel Ltd., a subsidiary of Canada Iron Foundries Ltd., Montreal, Que., will construct a structural steel plant at Burnside, N. S. It will be equipped with a 10-ton crane and machinery for cutting, punching, drilling, welding and painting steel and steel products.

U. S. Steel Awards Contract

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., was awarded a multimillion dollar contract by United States Steel Corp. for the manufacture of structural steel mill equipment. It is destined for the firm's South Works, South Chicago, Ill. Many automatic features will be incorporated in the new equipment, including automatic transfer and turnover devices. The machinery will be used to roll all types of structural steel. Principal elements in the contract

Trussless Steel Roof Tops Phoenix Coliseum

The completely unobstructed interior of the $750,000 Phoenix (Ariz.) Coliseum is made possible by a trussless steel roof deck made by Wonder Building Corp. of America, Chicago. The structure has a clear span 120 ft wide and 260 ft long. The roof consists of curved, 18-gage galvanized corrugated steel sheets, 2 ft wide and from 6 to 10 ft long, fastened by nuts and bolts to form self-supporting arches. Less than 1/16-in. thick, the roof is designed to withstand winds in excess of 113 mph, support loads up to 42 pounds per square foot

are divided into three classifications: A structural mill hot bed and transfer equipment; structural mill straighteners and appurtenances; and structural mill cold saw, shears, gages and appurtenances.

Combines Sales Operations

Brown & Sharpe Mfg. Co., Providence, R. I., and Nelco Tool Co. Inc., Manchester, Conn., will combine sales operations Sept. 1. This will afford industry "on the spot" delivery of some 3000 standard carbide, carbide-tipped and high-speed steel metal cutting tools and accessories through Brown & Sharpe-Nelco distributors. In addition to the standard lines, both Brown & Sharpe and Nelco will continue to produce special tools.

Thew Shovel Leases Property

Thew Shovel Co., Lorain, O., has leased the Magic Chef property in that city—eight buildings having aggregate floor space of 290,000 sq ft. Three of the buildings are already occupied under lease by this manufacturer of power shovels and cranes.

Kaiser Metal Builds Warehouse

Kaiser Metal Products Inc., New York, is constructing a 201,000-sq-ft warehouse at an estimated cost of $1 million. The company also is embarking on a $750,000 improvement program for its kitchen cabinet production facilities.

ACF Industries To Expand

ACF Industries Inc., heavily involved in secret work for the Atomic Energy Commission, is planning a $500,000 building expansion at 370 Babcock St., Buffalo. This is part of the company's Nuclear Products Division.

Nylok Licenses More Firms

Nylok Corp., New York, maker of self-locking fasteners, has licensed these firms: Buffalo Bolt Co., North Tonawanda, N. Y.; Federal Screw Works, Detroit; Standard Pressed Steel Co., Jenkintown, Pa., and its subsidiaries, Cleveland Cap Screw Co., Cleveland, and Cooper Precision Products, Los Angeles.

Fluor Corp. Gets Big Contract

Fluor Corp. Ltd., Los Angeles, was awarded a contract by Standard Oil Co. of California for the engineering and design of crude oil handling facilities at El Segundo, Calif. The total project will cost about $3 million. Construction is scheduled to begin in November. The facilities will consist of three 160,000-bbl tanks, three additional smaller storage tanks and miscellaneous lines, pumps and utilities.

REPRESENTATIVES

Revere Copper & Brass Inc., New York, appointed Fort Duquesne Steel Co., Pittsburgh, as a distributor of aluminum products in that area. Revere is completing a major expansion of its aluminum processing facilities at its Baltimore and Chicago plants.

National-U. S. Radiator Corp.'s Pacific Steel Boiler Division, Johnstown, Pa., appointed R. B. Sweet & Associates, Abington, Pa., as representatives in Delaware and southern New Jersey.

Tiby Engineering Co., Detroit, will handle sales of rotating components, monitoring and control components and standard electromechanical breadboard parts for **Helipot Corp.**, Pasadena, Calif.

H. E. Dickerman Mfg. Co., Springfield, Mass., appointed Quad Tool & Die Supply Co., Merchantville, N. J., a distributor of its automatic punch press feeds.

Alton Inc.'s Tygart Steel Products Division, McKeesport, Pa., was appointed Pittsburgh distributor of trussless steel buildings produced by Wonder Building Corp. of America, Chicago.

Axelson Mfg. Co., a division of U. S. Industries Inc., Los Angeles, appointed McBeth Machinery Co., Cincinnati and Philadelphia, as distributor of its heavy duty engine lathes.

H. K. Porter Co. Inc.'s Vulcan-Crucible Steel Division, Aliquippa, Pa., appointed Sabre Steel Service Inc., Buffalo, as its distributor in that territory. Tool steels, gage and die steels and drill rod will be stocked.

NEW ADDRESSES

S-P Mfg. Corp. completed its move into its new plant at 30201 Aurora Rd., Solon, O. The firm makes power chucks and cylinders, valves and accessories.

American Bosch Arma Corp. moved its headquarters to 320 Fulton Ave., Hempstead, N. Y. Vacated space at the Arma Division plant, Garden City, N. Y., will be utilized by that division for the administration of its expanding research and manufacturing programs.

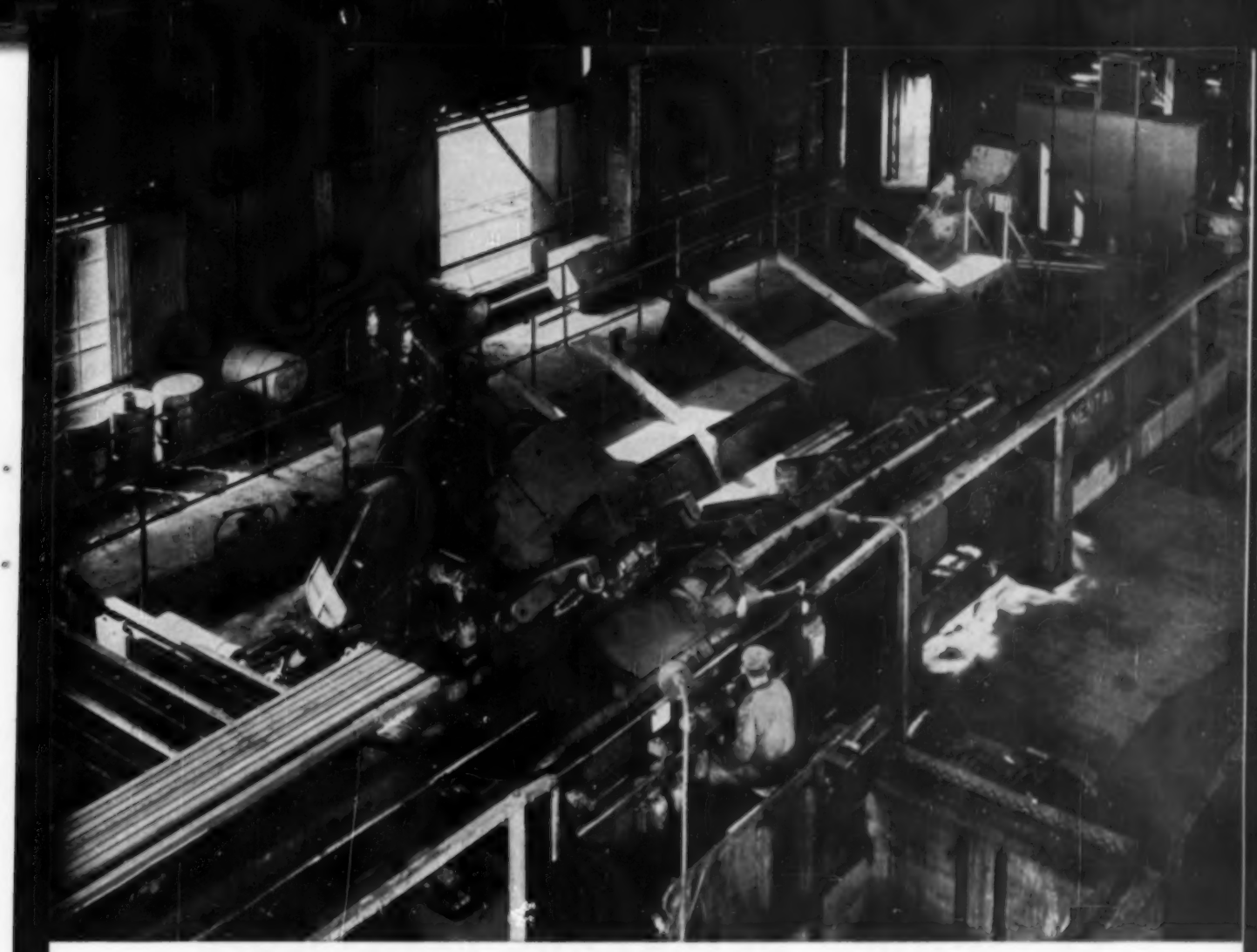
C. G. Hussey & Co., a division of Copper Range Co., Pittsburgh, opened an enlarged copper and brass warehouse in Long Island City, N. Y., replacing its Sixth avenue, New York, warehouse.

CONSOLIDATIONS

Treesdale Laboratories & Textile Processing Inc., Mars, Pa., purchased **Pittsburgh Metals Purifying Co.**, producer of exothermic compounds and fluxes for the metal industry. The firm will continue operations at its plant at 1352 Marvista St., Pittsburgh, under the direction of C. A. Marlowe, general manager.

Garrett Corp.'s wholly owned subsidiary, **Northill Co.**, Los Angeles, merged with Garrett's **Air Cruisers Division**, Belmar, N. J. Northill's principal products (lightweight anchor and the air-lung) will be produced and merchandised by the division, maker of survival equipment.

Minnesota Mining & Mfg. Co., St. Paul, purchased control of **Zenith Plastics Co.**, Los Angeles, manufacturer of aircraft components.



BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

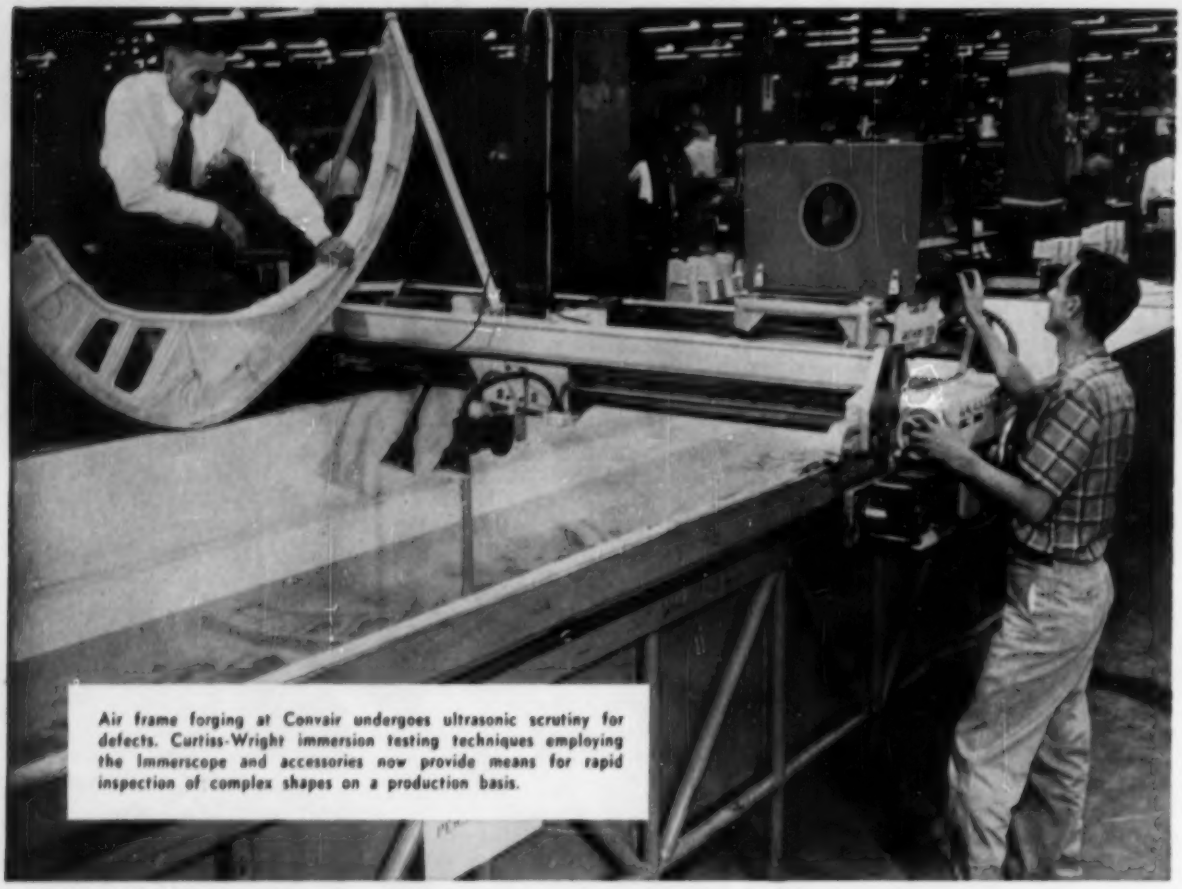
Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

50th Anniversary
BLAW-KNOX
1906-1956

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



Air frame forging at Convair undergoes ultrasonic scrutiny for defects. Curtiss-Wright immersion testing techniques employing the Immerscope and accessories now provide means for rapid inspection of complex shapes on a production basis.

Curtiss-Wright ULTRASONIC IMMERSCOPE Gives CONVAIR Forgings Final Exam for Quality

New Curtiss-Wright Immerscope (Model 424-A) protects quality of forgings, rolled plate, welded tubing, extrusions and other metal products. Complete with controls for gate width and depth, alarm trigger, and sensitivity time control. 400 w, 110-120 v, 60 cycle. 16"x15"x21½". Operates at 2.25, 5, 10, 15 and 25 megacycles.

Metal parts used by the aircraft industry are subjected to quality tests at all stages, from raw material to finished components. To insure *final* quality control at Convair-Fort Worth*, the Curtiss-Wright Ultrasonic Immerscope quickly detects flaws and discontinuities.

This ultrasonic detective "sees" through every square inch of the metal, with electrically induced sound vibrations up to several million cycles per second, revealing flaws as visible "pips" on a cathode ray tube.

The method is sure, fast and low in cost. Curtiss-Wright can engineer and custom-build production testing installations to your exact specifications. Write Industrial and Scientific Products Division, Curtiss-Wright Corporation, P. O. Box 270, Caldwell, N. J.

*Convair-Fort Worth, A Division of General Dynamics Corporation.

INDUSTRIAL AND SCIENTIFIC PRODUCTS DIVISION
CURTISS-WRIGHT
CORPORATION · CALDWELL, N. J.

Technical Outlook

HK31A AVAILABLE—If you need magnesium-thorium sheet (HK31A) for defense research, there's enough to go around now, says Dow Chemical Co., Midland, Mich. The alloy will take 800°F for a short time, 600°F for longer periods.

LESS STATIC—Eliminator rods for removing static electricity from machinery can be made for less from stainless tubing, claims Superior Tube Co., Norristown, Pa. It says one firm changed from solid rod and saved $1.23 per unit. Watch for other uses where tubing eliminates drilling or centering operations.

SHINING FUTURE—That's what Curtis Lighting Inc., Chicago, predicts for Alzac, an aluminum finish which is rapidly growing in popularity in the electrical fixture field. The finish (a product of Aluminum Co. of America, Pittsburgh) is more expensive than anodizing, but has advantages of being colorless, transparent and highly reflective.

REFINED—Jones & Laughlin Steel Corp. will spend $2 million to improve the quality of its coal chemicals. The corporation will use the Hydrofining process to remove sulphur from light oils and the Udex process to extract other nonaromatic impurities. The final products will be benzene, toluene and xylene of the high purity required for such products as synthetic fibers, rubber, dyes and drugs.

GAS PLATING—Commonwealth Engineering Co., Dayton, O., continues to make news with two related processes for gas plating metal slabs produced by continuous casting. Coatings keep the base metal from oxidizing and scaling. They can be plated heavily enough so that the result after rolling is a clad metal strip. Coatings of nickel, iron, chromium, molybdenum and cobalt are among those that can be applied to both ferrous and nonferrous bases.

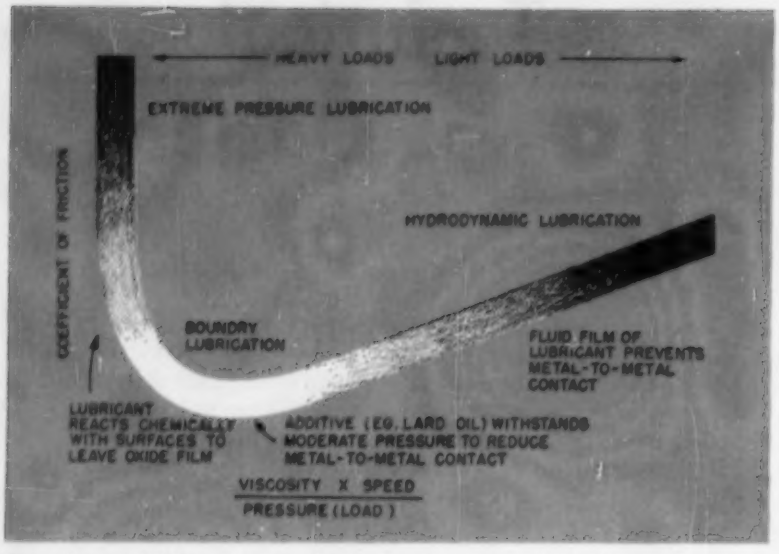
FREE-PISTON POWER—Development of a 1250 gas horsepower, free piston engine is far enough along to permit experimental installation in a ship, say GM engineers. Critical parts will run 4500 hours; thermal efficiency is 43½-per cent. A small version is being tested in the XP-500, an experimental auto.

MOTOR CANNERY—The improved market for electromagnetic pumps (like those in atomic sub *Seawolf*) and canned motors for reactors has prompted General Electric Co., Schenectady, N. Y., to put up $2 million for expansion. Facilities will be almost tripled within the next 12 months.

TEFLON HOSE COUPLING—Super - leakproof fittings: That's what Aeroquip Corp., Jackson, Mich., says it has developed for coupling Teflon hose. Fittings are simple to use and require only hand tools for attaching. Expected uses: Steam lines, in the chemical and atomic energy fields. Temperature range: Minus 100°F to plus 500°F.

WEATHER BOX—The air arm division of Westinghouse Electric Corp., Pittsburgh, will use its new weather chamber to test airborne electronic systems for the Navy and Air Force. It is about the size of a two-car garage. One section is for rain, humidity and salt sprays; the other for altitude and temperature tests.

Metalworking Outlook—p. 41 *Market Outlook—p. 115*


HEAVY LOADS
LIGHT LOADS
EXTREME PRESSURE LUBRICATION
COEFFICIENT OF FRICTION
HYDRODYNAMIC LUBRICATION
BOUNDRY LUBRICATION
FLUID FILM OF LUBRICANT PREVENTS METAL-TO-METAL CONTACT
LUBRICANT REACTS CHEMICALLY WITH SURFACES TO LEAVE OXIDE FILM
ADDITIVE (EG. LARD OIL) WITHSTANDS MODERATE PRESSURE TO REDUCE METAL-TO-METAL CONTACT
VISCOSITY X SPEED
PRESSURE (LOAD)

The science of lubrication can be broken down into these three phases. At the right, under light loads or high speeds or viscosity, a fluid film separates the surfaces. There's no metal-to-metal contact. At the left, metal-to-metal is frequent. A strong, solid film on the surfaces is needed to provide lubrication. Between these two, in a vaguely defined area, lies boundary lubrication in which the surfaces are kept apart by a tough fluid film that adheres to the metal

Lubricants of Tomorrow

Accompanying the boom in multipurpose oils and greases is a vigorous search for better specials. Synthetics are filling the bill for extreme conditions

WHEN A lubrication engineer looks at the job a lubricant has to do, he's likely to think in terms of the chart above, which breaks the subject down into three phases: Hydrodynamic, boundary and extreme pressure lubrication.

It plots coefficient of friction versus what engineers know as ZN/P, showing how the job of lubricating passes through the three phases.

They are the areas of development for tomorrow's lubricants. Lubrication engineers are striving to improve performance in all three, but they want to do it with better lubricants — those which are more stable, will work at higher (or lower) temperatures, are more versatile, will oxydize less rapidly, will prevent corrosion, will prevent foaming, repel water and be odorless under all conditions.

Place in Sun — The advent of synthetic manmade lubricants is history. The need for lubricants that will operate at full tilt under extreme conditions (notably in aircraft) has opened the door for synthetics.

Experts say that what's learned about lubricating with them will be equally advantageous to industry in the long run.

The Sizzle—Above all other challenges looms the problem of temperature, both high and low. Military queries are talking in terms of 700 to 1500°F, down to −65°F.

At those extremes, mineral oil lubricants are out. The job goes to the synthetics.

Definition—Most experts agree that when they mention synthetics, they're talking about lubricants based on materials that don't appear in nature — manmade substitutes, the products of chemistry.

Top Billing—Silicones and molybdenum disulphide corner the conversation in most discussions on synthetics. One of the curious differences between the two is that one is inherently a good lubricant; the other is not.

Silicones are a new branch on the lubricant family tree. They are used as fluids, with or without additives. They also can be thickened into greases by using conventional soaps, fillers, etc.

One Minus—Silicones have exceptional stability and thermal properties. (See chart, page 82). They will work at −100 to about 500°F. They also show good water repellence. Their one fault: They are only fair as lubricants.

Early attempts to put lubricating additives into silicones met with limited success, as did attempts to add silicones to lubricants. The final answer probably hasn't been found, but chemists believe it will involve modification of the silicone molecule. Silicone lube makers have recently added chlorine to the molecule.

There's some disagreement as to why the new silicones lubricate better than the straight silicones, but there is no disputing the evidence that they do.

The silicones are here to stay—there's little doubt about that. They already are used on a few civilian jobs, but their biggest applications are in aircraft, particularly jet aircraft. General Electric's silicone product department has made market estimates which show potential sales of more than $22 million for this type lubricant by the early 1960s. It assumes lubricants and hydraulic fluids for jets and missiles will be the chief products.

Moly — The molybdenum disulphide molecule, like graphite, is inherently a good lubricant. The most widely accepted explanation for it is that the MoS_2 molecule is made up of a layer of molybdenum atoms sandwiched between layers of sulphur atoms. The sulphur holds tight to the moly, but it forms only a loose tie with an adjacent sulphur. When sheared, the loose sulphur tie gives easily.

and it works like a deck of cards sliding between the palms of your hands.

Molybdenum disulphide already has found wide use in industry in applications similar to those for graphite, but Dr. Harold J. Dawe, Acheson Colloids Co., Port Huron, Mich., says moly apparently has better extreme pressure characteristics than graphite. Applied dry, it will work in temperatures from −100 up to about 1000°F. It also can be put in a solvent which will carry it into place. The solvent evaporates at working temperatures, leaving the solid-film.

The MoS_2 is added to oils, greases and silicones to enhance lubrication at high temperatures and high pressures. One of the biggest applications so far has been on ways and slides of machinery to prevent stick-slip motion.

Gases—In work at Cleveland's Lewis Flight Propulsion Laboratory, NACA, Freon (it's also used in refrigerators) has been played on a bearing area. It showed good lubricating ability on most steel surfaces.

Compared with mineral oils, synthetics, such as the diesters, are less volatile at high temperatures, slower to oxidize, more stable and have better pumpability at lower temperatures.

They can be modified in the same manner as petroleum products. Additives can bolster them for extreme pressure, better viscosity-temperature properties, detergency, adhesion to surfaces, etc.

Bearing Materials—It's no secret that some metallurgists are pondering the possibility of reducing the coefficient of friction of bearing materials themselves.

For example, Teflon's coefficient of friction is only a third that of nylon — about one-half that of the best boundary lubricant on steel. However, Teflon deforms plastically under high loads, losing its shape. Tried as a thin coating over metal (the metal holds the shape), it met with limited success because of its high coefficient of expansion. The material separated from the metal at high temperatures.

One likely solution is that worked out by F. P. Bowden of England's Cambridge University. Mr. Bowden has impregnated surface areas of powdered metal bearings with Teflon. Results: Lubricity is excellent; the bearing retains its shape; and materials do not separate. Possible applications may be in high speed, light load bearings for instruments, business machines, etc.

Work Horses—Despite spectacular and, many times, intriguing advances being made in synthetic lubricants, mineral oils will continue to be the work horses of industrial lubrication. The explanation: Petroleum lubricants are nearly always less expensive than the synthetics, and industry's requirements, while increasing in severity, seldom reach the extremes that force synthetics into the picture.

Twofold—The success with which a mineral oil can do its work depends on two separate phases of lubricant making: First, the refining process. Second, the use of additives.

Although there's always a research staff trying to improve refining, additives still have top priority in labs. The fact that about $160 million worth of them will be used this year shows that they are big business in their own right.

Additive Jobs—The task of lubricating with a mineral oil becomes increasingly complex as the environment of the job changes. With each change can come a need for an additive. Here is a list (it could almost be doubled) of ten different types:

Viscosity-index improvers, oxidation inhibitors, rust inhibitors, water repellents, oiliness agents, extreme pressure agents, pour-point depressants, emulsifiers, antifoam agents, antiwear agents.

Most Important—H. A. Hartung, research and development, Atlantic Refining Co., Philadelphia, feels the first three are getting the most attention today. VI improvers reflect the overriding concern of the industry about temperature. So do oxidation inhibitors.

Viscosity-index deals with the change in viscosity over a temperature range. Petroleum oils usually make a poor showing here when

PETROLEUM OILS:

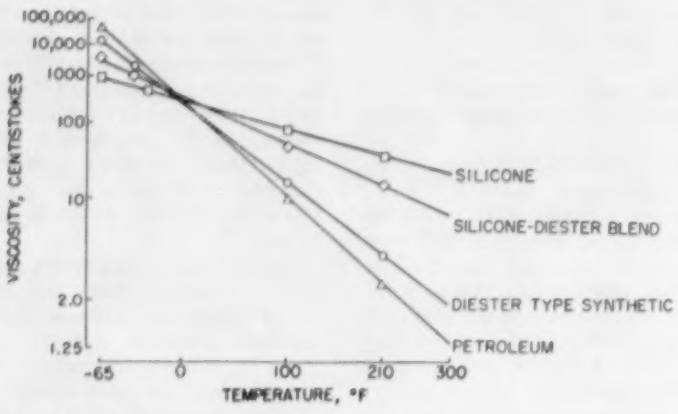
State of the Art

"REQUIREMENTS of modern production have long since passed the point where petroleum oil by itself can produce the proper lubrication results. Today's high quality oils for industrial service contain chemical addition agents to improve resistance to wear, to maintain the fluids unchanged for long periods of service, to eliminate rusting and corrosion and to do other special jobs.

"It is not uncommon for a premium industrial lubricating oil to contain as many as five different chemicals, each with a task to do. This poses another problem in the development of the lubricants: The petroleum oil must be carefully selected, and each of the chemical addition agents must co-operate, not fight with each other. For example, a chemical which improves antiwear characteristics may shorten the service life of the lubricating oil. This situation requires careful balancing of materials that go together to make up the finished lubricant, so the complex final lubricating oil gives satisfactory results in all phases of its required service.

Specials Vs. Multipurpose — "Lubricant suppliers are continually widening the service ranges of lubricants. On the other hand, the production managers' demands, plus the equipment designers' changes to meet them, sum up to a constantly widening need for improvements in several service characteristics of lubricants. The race is never won by anyone, and the need for specialized lubricants increases rather than diminishes."

A. C. Stutson, chief engineer, Industrial Division,
Socony Mobil Oil Co. Inc.
New York



Viscosity-temperature chart shows the temperature advantages of synthetics. These results from running small bearings at high temperatures indicate that petroleum lubricants for some jobs may be too thin at high temperatures, unpumpable at the low end. Silicones show the smallest viscosity change over the temperature range. Silicone, blended to improve lubricity, is a close second

Lewis Flight Propulsion Laboratory, NACA

compared with most synthetics. Despite this, lubricant makers are building in better VI performance with improved polymers.

Oxidation is the other temperature factor. Mineral oils oxidize, producing sludge, varnishes, etc. The oxidation rate doubles with every 18 to 20 degree rise in temperature. Almost every lab in the industry is working to retard the rate at which this oxidation occurs.

Versatility—The most significant trend in these oils: The development of multipurpose properties. By blending additives carefully to the proper base, one oil can extend across the range of many jobs.

Standard Oil Co. (Ohio), Cleveland, tells about a large auto part plant that used 53 different oils and greases. An engineered survey reduced the inventory to 12.

Greases — John P. Critchlow, chief fuel and lubricant engineer, rolling mill section, Gulf Oil Co., Pittsburgh, feels that the most important trend in greases is the move toward multipurpose products.

The greases that have come to the front are lithium, bentone, calcium, and barium. Lithium is the most popular. R. F. Repenning, staff engineer, Shell Oil Co., New York, says lithium greases have exceptional mechanical stability, work well from −30°F to about 250°F and have good water resistance. His firm is a pioneer in work on the lithium type.

The versatility of these greases is being broadened, as lubricant makers point for broader temperature ranges, higher pressure capacities, etc.

Standard Oil Co. (Indiana) also cites the firm move to multipurpose greases. The company feels even stronger about it than that. Engineers cite cases where multipurpose products are moving into some extreme areas formerly met by specials.

To tackle temperature, gel-type greases are moving up. Frank Heist, lubrication engineer, E. F. Houghton Co., Philadelphia, says his company has introduced a bentone grease that doesn't melt. This family is aimed directly at high temperature applications (the runout tables on plate mills, for example), but they also have good resistance to water and oxidation.

Film Strength—Henry J. Winkler, vice president-research and development, Brooks Oil Co., Cleveland, also sights the importance of grease film strength as evidenced by a recent U. S. Steel Corp. test which indicates the ability of a lubricant to perform without replenishment. Mr. Winkler says his company, a specialist in leaded lubricants, is working to boost the film strength of its products.

What They're Thinking

Trends in lubricant developments usually are reflected in solutions to immediate or anticipated problems. Here are statements by some of the country's top experts: They reveal both problems and developments that will be tomorrow's trends.

Multipurpose Greases: "Biggest news in petroleum lubricants is the vastly improved multipurpose grease."

Turbine Oils: "We intend to market a turbine oil that's good for the life of the turbine."

Stability: "We need to further increase the stability of oils for circulating, centralized systems."

Tripurpose: "We're working on an oil that will be lubricant, cutting oil and hydraulic fluid all in one. It may handle a majority of machine shop jobs. We know it won't be for extreme conditions."

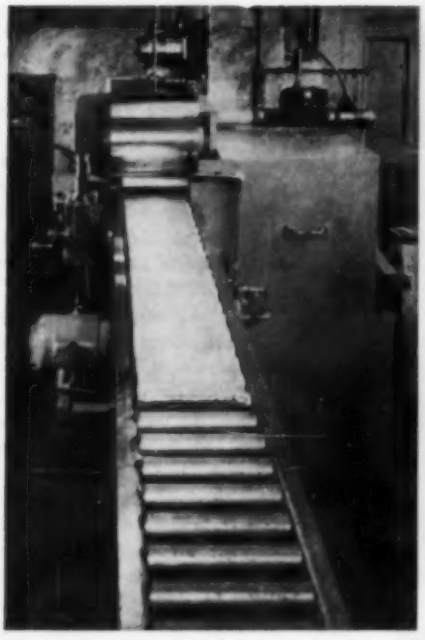
Synthetics: "Fantastic demands by aircraft, will bring superior lubricants to industry's hot spots. Synthetics look to be the answer."

Machine Slides: "Solid lubricants are helping us whip the old stick-slip problem."

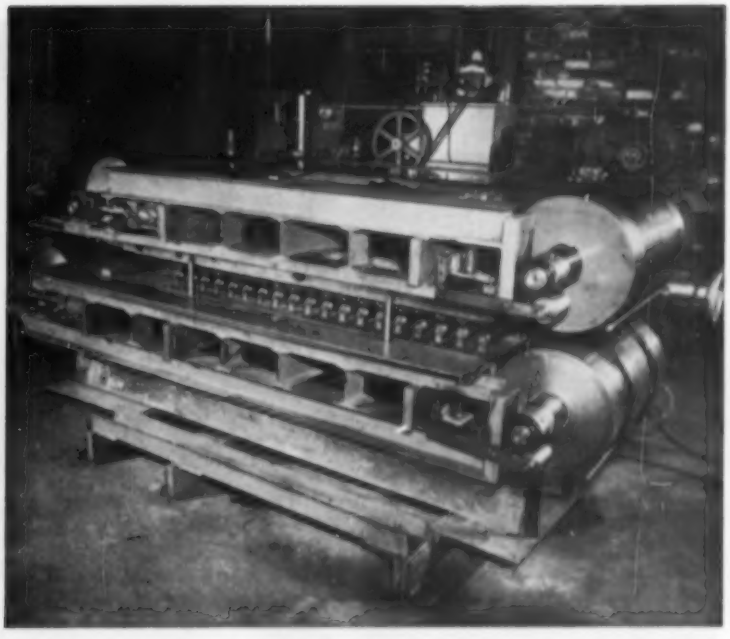
Bearing Materials: "Powdered metal bearing parts impregnated with Teflon look good for high speed, light load jobs."

Temperature: "The biggest single challenge we face comes from temperature extremes, −100 to 1500°F."

Cost: "Petroleum products are challenged by synthetics, but only on problem jobs. Cost of synthetics will turn all but the severe requirements back to petroleum."



Pilot mill casting aluminum strip. Alloy shown has a clean matte finish



A 24-in. continuous strip mill. Small rollers between the top and bottom sections support the thin metal belts and the cast strip

Continuously Cast Strip

A method that approaches this process from a different angle is successful for nonferrous metals. Its inventors are certain it will be used soon to cast all metals

NONFERROUS strip from ½ to 1½ in. thick can be cast continuously by a movable commercial mill. Using the Hazelett process, molten metal is poured directly between two thin metal belts which are water cooled. Metal dams confine the edges and permit the adjustment of strip width in less than 5 minutes.

Pure metals like aluminum and zinc have a mirror finish. Alloys have a smooth matte finish.

Speed — Because of cooling requirements, speed determines the length of the mill. Early models cast ½-in. aluminum strip at 55 fpm. Later models operate at 20 fpm. The casting of hundreds of tons an hour is feasible.

Developed with the assistance of the W. S. Rockwell Co., Fairfield, Conn., the mills need only 2 hp per foot of width and a 7½-hp pump to cast 5 tons of aluminum an hour. Metals with a higher melting point require larger pumps. In big tonnage operations, large sources of cool water or cooling towers are necessary.

Fine Grain — The inventors and developers, R. William and Richard Hazelett, say that the extremely quick chilling, especially in the thin strip, produces the finest grain size with the least segregation of any direct castings made. No grain refiners are needed. And there is no edge cracking.

The yield approaches 100 per cent when long heats are poured, since there are only a few inches of scrap at the ends of each strip. The thinner the strip, the higher the tonnage output, the lower the cost and the better the quality.

Delivery—The strip can be delivered horizontally for further work, such as rolling or coiling. The single unit can be moved from one furnace to another or repositioned for runs of other metals.

Metals are cast at lower temperatures than usual. Savings include reductions in fuel costs, in loss of zinc content in brasses, and oxidation. If added protection is required, only a relatively small area needs to be provided with a suitable atmosphere.

Small Firms—According to the Hazeletts, this method eliminates much of the investment needed for conventional mills. It lends itself to the small firm or even to the consumer who wishes to process large amounts of scrap.

The inventors believe that in the near future all metals, including steel, will be commercially cast by this process.

Automatic welding of titanium. To prevent absorption of oxygen and nitrogen, the arc and the hot weld metal are protected by argon or helium

Three Ways To Weld Titanium

At temperatures over 1000°F, the metal absorbs nitrogen and oxygen from air, which makes it too brittle. Inert gas offers satisfactory protection. Here are three ways it's used

By J. W. CUNNINGHAM
Air Reduction Sales Co.
New York

THE KEY to titanium welding is inert gas. Air Reduction Sales Co. found in its technical laboratories, Murray Hill, N. J., and in the field that three methods produce excellent welds:

Tungsten arc welding (Heliweld); consumable electrode, inert gas welding (Aircomatic); and gas shielded spot welding (Aircospot).

Here are its recommendations:

Avoid Pitfalls—Welding methods must exclude the atmosphere from molten weld metal. Even at 1000°F, continued exposure to air tends to make titanium brittle. Although oxygen and nitrogen are powerful solid solution strengthening agents, they cause excessive embrittlement.

Inert gas welding by either the tungsten or consumable arc method produces welds with similar properties. Variations can be traced to differences in the physical properties of the base metal. Good welds require an almost pure metal.

Impurities in commercial titanium (principally oxygen, nitrogen and carbon) generally are held to a cumulative total of 0.5 per cent. Carbon is not as powerful a hardening agent as either oxygen or nitrogen, but it decreases machinability through the formation of hard titanium carbide. High oxygen and nitrogen contents (within 0.20 per cent oxygen and 0.10 per cent nitrogen) produce welds of high strength and low ductility; low oxygen and nitrogen contents leave the weld metal low in strength and high in ductility.

Best — Commercially pure (all-alpha structure) titanium and its alloys with aluminum are the most weldable. This table will give you an idea of how titanium and its alloys stack up:

	Structure	Composition
Most Weldable	All Alpha	Pure Ti and alloys of Al, only
Least Weldable	Alpha-Beta	Typical alloys contain these combinations: Al & Cr, Al & Mn, Al & Mo
	Beta	Alloys that contain more than 5% Cr, Mn, Fe or Mo

Alloy 6Al-4V may be an exception. It has an alpha-beta structure, but weldability is reported to be good.

In all cases, filler rod composition should match the base metal.

Tungsten Arc — Radiographic examinations of shielded tungsten arc welds indicate that they are sound. The general advantages of the method with other metals (faster welding speeds, cleaner metal, etc.) also apply to titanium.

At present, the tungsten arc method should be used only in the downhand position on metals 0.010 to 0.125-in. thick. Greater thicknesses can be welded by the consumable electrode inert gas method. The table (page 85) contains data for the selection and regulation of Heliweld equipment.

Selection Table for Heliweld Equipment

Metal Thickness (In.)	Tungsten Electrode (In. Diam)	Direct Current Straight Polarity	Argon Flow Cf/hr	Filler Rod	Number of Passes
0.062	3/32	125	22	None	1
0.062	1/16	90	8	None	1
0.077	3/32	125	22	None	1
0.085	1/16	110	16	None	1
0.085	1/16	110	12	3/16-in.	1
0.085	3/32	110	18	None	1
0.115	3/32	125	18	None	1
			Helium Flow		
0.175	1/16	27	28	None	1

Techniques—In general, the procedure for welding stainless steel is used. Special care must be taken to provide adequate gas coverage of the weld area. Both the top and bottom of the weld are protected. We have found a trailing shield (illustration, page 84) necessary to protect the hot but solidified portion of the weld. A perforated copper backup plate and the flushing of the plate with helium or argon are also strict requirements.

Downhand welding using the forehand technique is best. This makes it possible for the operator to watch the molten puddle and arc while controlling the filler wire addition to the weld metal. The hot end of the filler wire should not be removed from the gas shield.

Where welds call for more than one pass or bead, it is important that interpass temperatures be between 125 and 185°F. Be cautious about using more than two passes. You may get weld porosity.

Use thoriated tungsten electrodes for all applications.

Power — Best results are obtained by using direct current and straight polarity. Continuous high frequency alternating current with argon gas has been used successfully in welding light wall tubing.

Preparation — The same joint designs used in stainless steel are satisfactory for titanium. Preheat generally isn't recommended since its only effect is to weaken the joint.

Make sure that both joint and filler wire surfaces are clean. Either mechanical or chemical means may be employed.

The bend ductility of alpha-beta and beta alloys decreases rapidly as the alloy content increases. Heat treatment in air or inert gas will improve the bend ductility of welded titanium with alloying elements running up to 6 per cent. Postweld heat treatment may not be needed if the figure is less than 3 per cent.

Consumable Arc—Titanium can also be welded with standard consumable electrode equipment, manual or automatic, which is suitably modified. The nylon bushings and smooth feed rolls usually employed with aluminum wire are quite satisfactory.

For manual operation, we use a water-cooled gun. When an auto-

Top and bottom (root) surfaces of a titanium weld. Root surface was protected by a copper backing bar. Weld

was made in ⅜-in. plate by a consumable electrode shielded arc

matic head is employed, high-speed wire feed arrangements are needed since the wire requirement runs from 50 to 75 per cent greater than that for mild steel.

Blanket — To provide protection against oxygen and nitrogen pick-up, the same type trailing shield and the copper, water-cooled chill bar used with the tungsten arc are necessary. The same equipment will work for either manual or automatic application.

Our tests show that the best arc characteristics are obtained on direct current and reverse polarity. Beads have a smooth surface, a fairly high build-up and good fusion to the base plate. Cross sections show good penetration into the base metal.

The usual current range for 3/16-in. and thicker material is 300 to 320 amperes with a 1/16-in. electrode. More current can be used for heavier materials.

The metal transfer through the arc should be a fast drop, almost a spray. Use a long arc—the transfer is more uniform, there is little spatter, and it's easier to control. A short arc will give you high spatter.

We like argon for the arc shield. It gives better results, although a helium-argon (75-25) mixture can be used. The root trailing shield works equally well with either argon or helium.

Wire—Commercially pure titanium filler wire is available. It is suitable for either of the welding methods described. Although primarily for welding pure titanium, it is successful with a number of other titanium alloys where maximum joint efficiency is not essential.

Third—Titanium has been spot welded in Air Reduction's laboratories. You need only one electrode. The inert gas shield around the electrode reduces air contamination.

Laboratory tests show that this method can be used commercially. Welds are somewhat weaker than those made by conventional methods, but they are adequate for many applications.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Before . . .

After . . .

Relighting the Shop

COMPARE the before and after pictures above. They show the results of a relighting program in the New York Central Railroad's wheel shop.

"Before" shows the antiquated, 240 volt, direct current system—bare bulbs hung from cords. General illumination was 1 to 2 foot-candles. Glare, contrast and shadows caused eyestrain; it was difficult for workers to read micrometers.

"After" shows the shop with industrial fluorescent fixtures. Walls and ceilings were painted to reflect light rather than absorb it. General illumination is about 40 foot-candles.

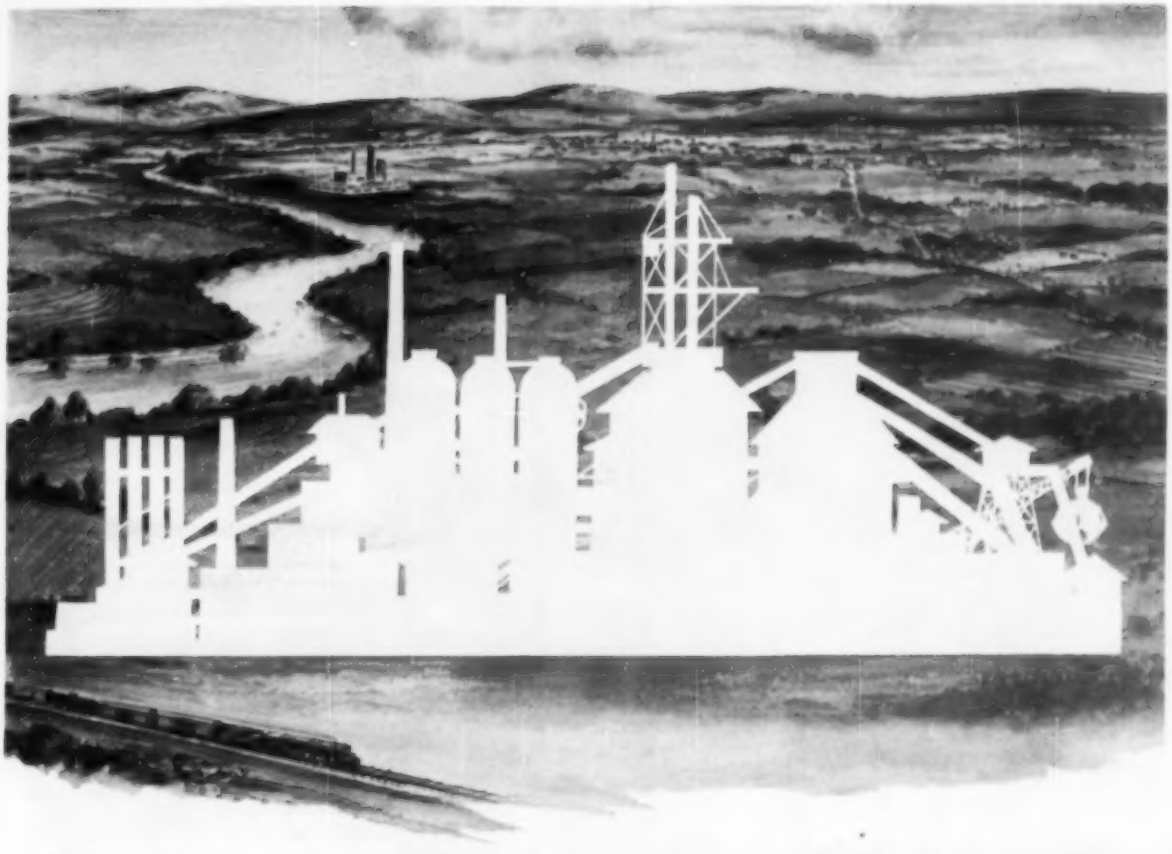
Results—Workers' morale, efficiency and productivity have increased. They can read micrometers any place in the area. Lighting is important to safety, too. Since the new system has been installed, there have been no lost-time injuries.

The armature shop annex got similar treatment. Before, this building also had a 240 volt, direct current system with incandescent bulbs hung on drop cords.

Now—This area, which is 54 x 300 ft, has been relighted with a combination of mercury and filament lighting. The old bulbs were replaced by General Electric 750 watt R-52's. Mercury vapor lamps were alternated with the incandescent bulbs.

Fixtures are on 14-ft centers, mounted 24 ft from the floor. This combination produces a lighting level of 35 to 40 foot-candles.

Workers like the new lighting. Management feels the filament-mercury system is a good investment: It's economical, gives adequate color rendition and produces good seeing conditions.



There's a place for a Steel Mill on the N&W

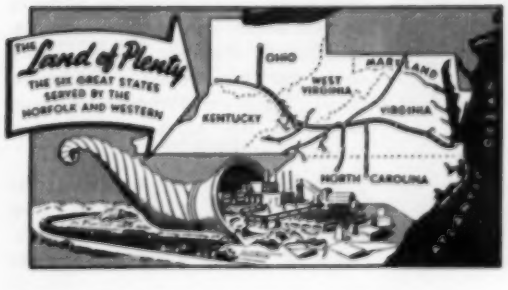
In the Land of Plenty you can build a steel mill virtually on top of almost unlimited supplies of the world's finest Bituminous Coal and high-calcium limestone. And you can avail yourself of short-haul advantages in transporting ore from the strategically located Port of Norfolk.

The water needed for steel production, on any logically conceivable scale, is available here, too.

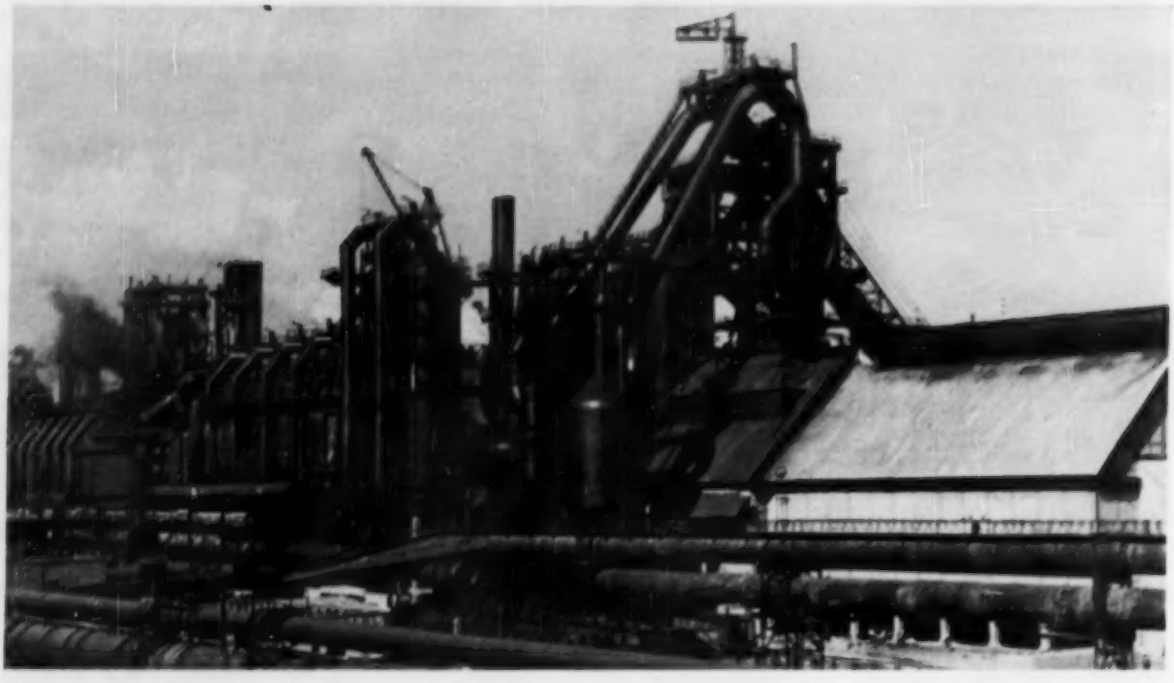
Recent scientific studies have revealed some startling facts about the Land of Plenty in regard to its advantages for the steel industry. We invite you to contact our plant location specialists for detailed information, which will be furnished in confidence and without obligation.

Write, Wire or Call:

L. E. WARD, Jr., Manager
INDUSTRIAL AND AGRICULTURAL DEPT.
Drawer 9-728, (Phone 4-1451, Ext. 474)
Norfolk and Western Railway
ROANOKE, VIRGINIA



Norfolk and Western RAILWAY



The No. 5 blast furnace at Zaporozhe. High top pressure and much gas cleaning equipment result in almost fumeless performance

Furnace Maker Visits Russian Steel Mills

He found:

- No unusual automation on rolling mills
- A continuous hot dip process for tinning coils
- Great eagerness to talk shop
- High level skills bucking low level production

THE Iron Curtain was pulled aside last month for Cleveland industrialist Lee Wilson (Lee Wilson Engineering Corp. (Inc.). He spent three weeks talking with Russian steelmen. He came back convinced that many of our ideas about Russia are myths.

At Magnitogorsk, crowds turned out to stare at the first western man to penetrate the Urals since World War II. Everywhere the response was friendly. He was allowed to see and photograph whatever he wanted.

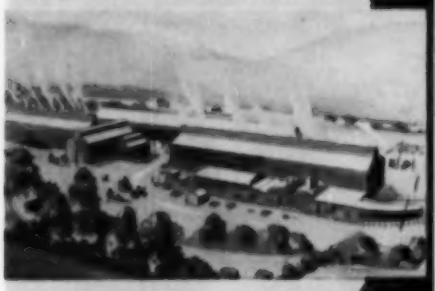
Automation?—Nowhere did he see any of the pushbutton steelmaking persistently rumored since an Indian mission reported back from Russia some months ago. Lack of understanding may be at the bottom of it: The modern steel mill, with its scattered workers dwarfed by huge equipment, looks automated to the uninitiated.

Another possibility: In Moscow, visitors are shown displays of advanced steelmaking such as continuous casting, and up-to-the-minute examples of automated machines which appeared to be prototypes to Mr. Wilson; he saw nothing equivalent in production. He did learn that two pilot installations for continuous casting have reached a stage approaching that of pilot lines in this country. But the Russians are beset by problems of surface quality on the cast slabs, he was told.

Finishing—So far as Mr. Wilson could observe at Magnitogorsk and Zaporozhe, Russian rolling practice is well below American standards, but meets Russian needs. Both cold and hot rolled coils were small. Surface finish was poor. Edges of hot bands showed frequent cracking.

Mr. Wilson is convinced that the Russians have the ability and know-how to produce limited quantities of materials or machines to

PHILO, OHIO



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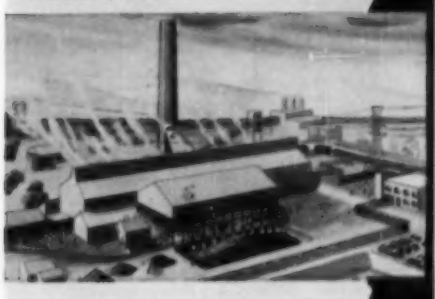

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high quality standards. They run into difficulties with high quality mass production.

Cold Strip—Although the dream of every Russian is to own an automobile, auto production is too limited to demand much cold strip. Much of the limited quantity produced seems to go into tin plate.

About 14 in. is the popular width for tin plate. The Russians have a continuous hot dip process for coils. Coils are also tinned electrolytically. The electrolytic plate, bright gold on both sides, looked unusual to Mr. Wilson, but his hosts regarded it as commonplace and seemed to think it the usual way for tin plate to be produced.

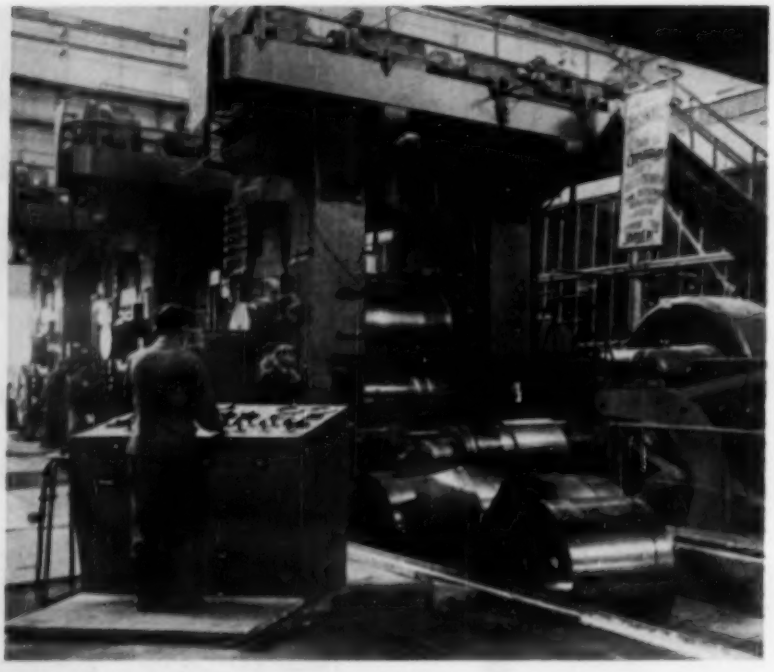
Blast Furnaces — In contrast with its finishing practice, Soviet blast furnace operation appears to be much advanced. The five furnaces at Zaporozhe operate with a top pressure of 0.8 atmospheres (11.76 psi). Charge is 95 per cent sinter. Moisture content of the blast is balanced against moisture content of the charge (an average of 0.7 grams of steam is added to each cubic foot of air).

Refractory work is conventional, and linings have an average life of five to six years. Carbon linings are not used. The five furnaces at Zaporozhe are producing about 2.8 million tons of iron annually, with a coke consumption of 1750 lb per ton of iron.

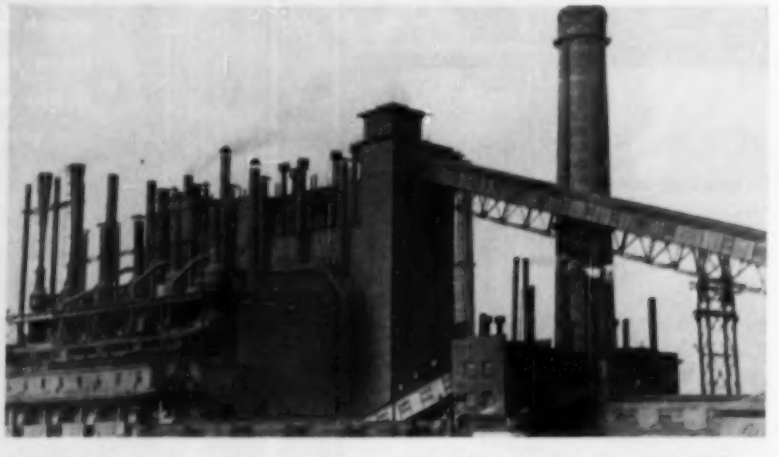
Officials point proudly to the air cleaning system. High top pressure and extensive gas cleaning equipment keep escaping fumes to a minimum. Concern with clean air contrasts strongly with the attitude toward worker safety. Hard hats and safety shoes appear to be unknown. Many workers wear soft footwear resembling bedroom slippers or tennis shoes.

Oxygen—Mr. Wilson asked about the oxygen converter process. Some Russian engineers have observed it at Linz, but nothing is being done with it. Oxygen is used through the burner ports of all open hearths (they tried it through the roof, but had trouble keeping roofs from burning out). They bring the oxygen content of the air up to 25 per cent.

In the realm of things to come, a tin plate mill is planned at Magnitogorsk as part of a renovation program. Other equipment is being moved out to make room for it in an old building. Ground has been broken for a 118-in. hot strip mill, Mr. Wilson was told, but nothing was visible to indicate how soon the mill will be completed.



Cold mill installed at Zaporozhe. By American standards, acceptable coils are small, have poor finishes



Agglomeration plant at Zaporozhe. Russian blast furnaces are operated on a burden of 95 per cent sinter

To Business—For companies interested in selling in the Soviet Union, Mr. Wilson found you don't do business at the plant level. Plant executives perform operating and personnel functions; purchasing and distribution are centralized in Moscow.

But opportunity for sales is tremendous, Mr. Wilson feels. The country simply cannot produce enough to meet the demand. Sellers can expect to have designs copied, a situation they will have to hedge against with high prices, large initial orders and licensing agreements.

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Scalding steam—a roaring, raging demon hot enough to cause severe injury or death on contact—is tamed and controlled by U. S. Matchless® Steam Hose. After long, safe service (even with steam pressures up to 200 pounds) the wall structure, instead of bursting, allows a trickle of steam to merely *leak* through—acting as a safety valve and giving notice that it's finally time for a replacement. That's why plant safety councils everywhere firmly approve of the U. S. Matchless.

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	Metering devices Hydraulic pumps	Same as above
Antifriction bearings	Instrument bearings Ultrasonic precision bearings Quality pillow blocks	Upgrades bearings Reduces cleaning time Ups quality, life, reduces labor
Jewelry	Costume jewelry, rings, watch cases, etc.	Does highest quality cleaning
Outboard marine engines	Cylinders	Eliminates residual honing compounds
Refrigerators and air conditioners	All parts	Reduces residual soil Reduces rejects
Hydraulic valves	All parts	Completes removal of abrasives Makes for easier assembly, better fits, fewer rejects
Temperature controls and safety valves	Contact points	Results in better cleaning, less labor, fewer rejects
	Bimetallic elements	Simplifies testing
Automotive engines	Hydraulic valve lifters, pushrods, automatic transmission gears	Reduces residual soil at low labor costs
Automotive (general)	Power steering, hydraulic pumps, valves	Does precise cleaning for less Improves operation of components

Source: Detrex Corp., Detroit

Clean to the Last Micron

Deeper, more thorough cleaning of precision parts . . . that's the task assigned to a good team: Ultrasonics, plus degreasing. They are important to the accuracy of guided missiles

AS the chart above shows, there are many applications for ultrasonic cleaning. Combined with other controls (air conditioning and special clothing), it leaves parts super clean.

Example—Take instruments. In today's jet planes and guided missiles, a piece of lint throws them out of adjustment, causing errors measured in miles. A fingerprint can throw accuracy off 0.1 per cent, which is an intolerable deviation for a guided missile.

Parts for supersonic controls use wires finer than a human hair, ball bearings that fit the end of a toothpick. Thousands of such miniature parts are needed. They must be absolutely clean to insure faultless operation.

Helper—Aircraft and instrument makers have had to rely on air conditioning, lint free clothing, tweezers or hand wiping to prevent the contamination of delicate parts. Costs have been high.

Ultrasonic cleaning eliminates many of those precautions. Particles as small as 1 micron are easily removed.

Engineers at the Guided Missile Plant, Hughes Aircraft Co., Tuscon, Ariz., had to learn about ultrasonic cleaning the hard way. Some parts for its missiles required a seemingly impossible degree of cleanliness. The Los Angeles office of Detrex Corp., Detroit, sent its ultrasonic demonstration unit.

Until an installation could be completed, parts were flown from Tuscon to Los Angeles.

Your Wickwire Rope Distributor and our die maker... ready to serve you

This die maker—one of the skilled technicians responsible for the quality of our rope wire—is with your Wickwire Distributor every time he makes a call.

True, he's physically in our plant, working to tolerances of 1/10,000 of an inch as he fashions the super-hard carbide dies used to produce every foot of rope wire. But, whenever your Wickwire Distributor makes his call, he has the full assurance that *every* wire in the product is exactly the size it should be and has a smooth, silky surface finish. This careful attention helps assure a rope which will perform successfully.

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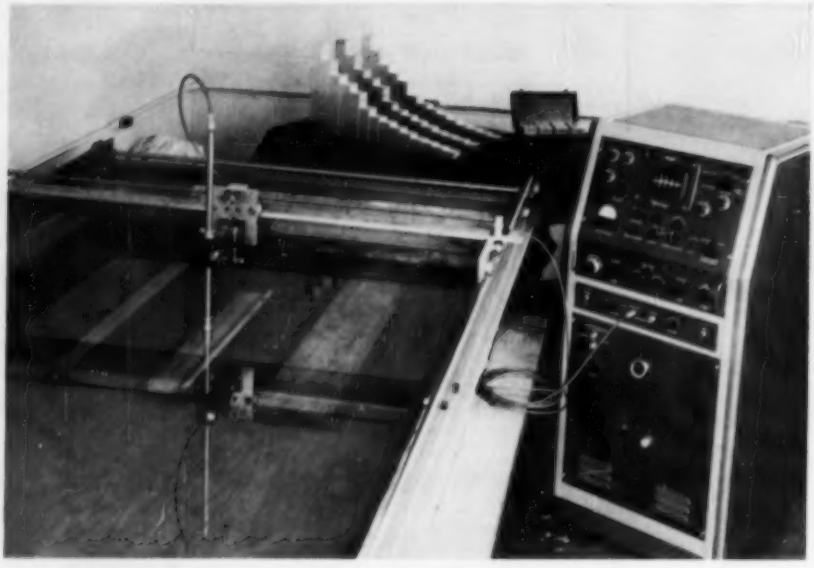
This technique lends itself to rapid inspection of regularly shaped objects, but is flexible enough to permit inspection of many complex shapes



Typical setup for immersion testing with instrument, tank, searching unit with holder and traversing mechanism

Ultrasonic Testing by Immersion Method

ULTRASONIC inspection is extremely versatile. In a relatively short time, it has found widespread use in the detection of cracks, voids and inclusions in metal products.

In tests using pulse-echo equipment, such as the Sperry Reflectoscope or Curtiss-Wright Immerscope, there are two principal methods—contact and immersion. The immersion method is the newer.

Contact Method—In this technique, the searching unit (which is the source of ultrasonic energy) directly contacts the test article through a thin film of oil or other suitable couplant.

Fig. 1 shows the passage of ultrasonic energy through the test piece and a typical screen pattern of the contact method. As energy leaves the searching unit, an indication appears on the left side of the instrument's cathode ray tube screen. This is called the initial pulse.

Defects — The energy travels through the metal until it hits a discontinuity, then part of the beam is reflected back to the searching unit. The second indication from the left represents this reflected energy.

The third indication is the result of ultrasound that has traveled through the article to the far surface.

Other Indications—Not all the energy is received by the searching unit on the first "bounce." Some of the energy bounces back and forth, resulting in multiple or higher order indications. The beam striking the sides of the test piece also will cause indications on the screen.

Multiple and side reflections need not be confusing; indications from defects within the test piece appear between the initial pulse and first back reflection. Side and multiple back reflections come later and do not confuse this part of the pattern.

Multiple back reflections sometimes are used to indicate quality of material. Appreciable loss of back reflection from one part to another (both having parallel surfaces) can be indicative of a generally unsound condition, such as porosity.

Immersion Method—In the immersion method, the searching unit does not directly contact the test part, but is usually separated from it by 1 in. or more of water. Other liquids can be used, but water has been found most satisfactory.

Immersion testing gives a different screen pattern. Fig. 2 shows the searching unit, workpiece and a typical screen pattern.

Pattern—The first indication on the left again is the initial pulse and coincides with the time the ultrasonic beam leaves the searching unit.

The ultrasound travels through the water layer and strikes the front surface of the article where part of the energy is reflected back. This causes the second screen indication. The space between the initial pulse and front surface reflection indications is equivalent to the water distance. This part of the pattern contains no useful information and can be removed by use of the instrument's sweep or time delay controls.

Other Pips—The third pulse on the screen indicates a discontinuity. The fourth indication shows the far surface of the article.

As in the contact method, higher order reflections occur from the front and back surfaces as well as discontinuities, and can be indicative of material quality.

The useful portion of the screen pattern is that between the first front and back indications, where

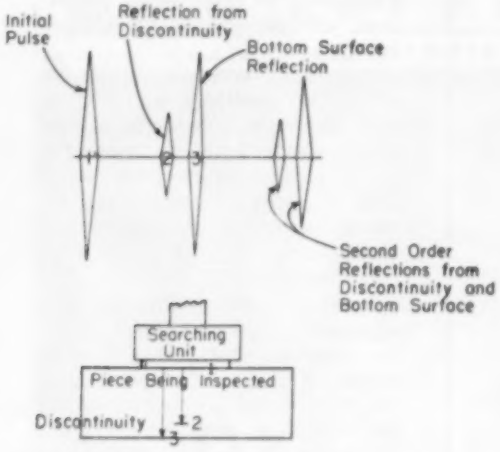


Fig. 1—Contact method of ultrasonic testing

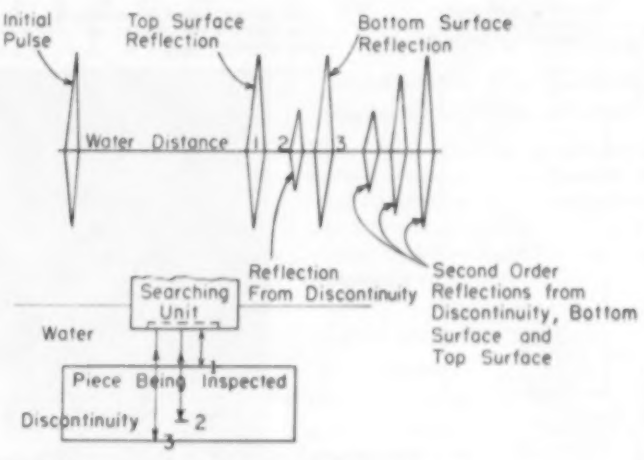


Fig. 2—Immersion method of ultrasonic testing

all first order indications of defects appear.

Water Distance—In the immersion method, it is important to use the proper water distance between the searching unit and the test piece. At least 1 in. of water must be used for every 4 in. of aluminum or steel.

If this is not done, the second order reflection from the front surface will appear between the first order front and back surface indications, hiding discontinuities.

Equipment—To inspect by the immersion method you need:

1. Instrument (pulse-echo type, such as the Immerscope or Reflectoscope).
2. Tank with suitable couplant in which the part can be immersed.
3. Searching unit.
4. Holder for searching unit.
5. Traversing mechanism.

Crystals — Quartz crystals are most widely used as transducers, although polarized barium titanate and lithium sulphate have found some use. Lithium sulphate is new and has one apparent advantage; it permits the detection of defects closer to the surface than quartz crystals of the same frequency.

Angulation—One of the advantages of the immersion method is the ease with which the crystal can be angulated with respect to the test piece. The searching unit must be mounted in a holder that will permit angulation.

It should be possible to move the unit up or down to obtain the

By J. B. MORGAN
Research Engineer
Alcoa Research Laboratories
New Kensington, Pa.

proper distance between it and the article. Adequate inspection of irregular shapes and the determination of the size of discontinuities call for universal angulation of the searching unit. The maximum dimensions of discontinuities are not always parallel to the surface of the part.

Alignment—It is important to properly align the searching unit with the test piece so a maximum amount of energy can search the part.

In routine inspection, the searching unit is adjusted to get a maximum number of indications on the screen. When a discontinuity is found, the angle of the searching unit is adjusted to get a maximum response from the discontinuity.

Traverse—A traversing mechanism that will permit movement of the searching unit along the length and width of the part is necessary so it can be completely scanned.

Routine examination of regularly shaped objects, such as plate, is done by moving the searching unit from one end of the tank to the other, indexing the searching unit and scanning back until the entire piece has been covered. The mechanism can be mechanically driven.

Testing—The immersion testing procedure can be broken into five steps:

1. Place test part in tank filled with couplant.
2. Select proper searching unit.
3. Adjust instrument controls.
4. Scan article.
5. Interpret results.

When the part is put in the tank, it should be relatively clean. Foreign material can interfere with the penetration of ultrasonic energy and can contaminate the couplant. Foreign material in the water normally is not detrimental to the immersion test, but it can be bothersome to the operator since energy is reflected by the particles in the water and causes small indications on the trace line of the cathode ray tube.

Air bubbles that form on the face of the searching unit or the surface of the test piece hinder penetration of the ultrasound. Aersol sometimes is used as a wetting agent to eliminate this. If the water is allowed to remain in the tank for one or two days, trouble from air bubble formation usually disappears.

Searching Units — In selecting the proper searching unit, several factors must be considered:

1. Geometry of the article.
2. Penetrability of the article.
3. How close to the surface discontinuities must be detected.

Geometry—If the part has a small front surface, as is frequently the case with die forgings and extrusions, a small searching unit will do a better job of directing the beam into the part. If the

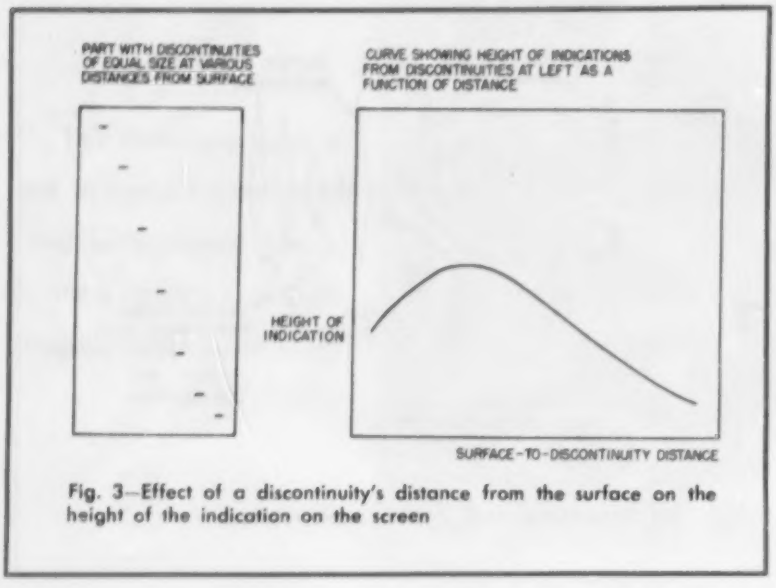

PART WITH DISCONTINUITIES OF EQUAL SIZE AT VARIOUS DISTANCES FROM SURFACE
CURVE SHOWING HEIGHT OF INDICATIONS FROM DISCONTINUITIES AT LEFT AS A FUNCTION OF DISTANCE
HEIGHT OF INDICATION
SURFACE-TO-DISCONTINUITY DISTANCE

Fig. 3—Effect of a discontinuity's distance from the surface on the height of the indication on the screen

article is regular in shape, such as plate, a large searching unit will allow you to scan more rapidly.

Frequency—In choosing test frequency, the penetrability of the material must be taken into account. At higher frequencies, small discontinuities in the material tend to scatter the ultrasonic beam and reduce penetration. Such defects are usually of little, or no, significance to the usefulness of the part.

Lower frequencies are needed to penetrate ingots than those called for by products that have been worked by forging, rolling or extruding. The frequency range of pulse-type ultrasonic equipment is less than 1 mc to 25 mc. The 2¼ to 15 mc range is most widely used.

Detection—The length of high frequency pulses is considerably less than that of the low frequency. If it is not necessary to detect discontinuities closer than ½-in. to the surface, a test frequency of 5 mc might be chosen. If it is necessary to detect discontinuities only ⅛-in. below the surface, a frequency of 15 mc probably would be chosen.

Reference Blocks—It is necessary to adjust the instrument to insure proper inspection. Aluminum Co. of America's ultrasonic standard reference blocks, Series A, have been widely accepted for this use. They are aluminum alloy blocks, each containing a different size, flat-bottomed hole. Holes range from 1/64 to 8/64-in. in diameter, in 1/64-in. steps. A flat bottomed hole is used because it is a good reflector of energy.

A block containing a hole of appropriate size for standardization is placed in the tank. The searching unit is centered over the block. The sweep of the instrument is compressed to show all indications on the cathode ray tube screen.

Adjustment—The angle of the searching unit is adjusted to obtain a maximum number of indications. The sweep is then expanded to show the first indication from the hole in the block. The searching unit is further positioned to give maximum response.

The height of the indication is adjusted to detect objectionable discontinuities in the part. One way of determining this is to use blocks of different lengths covering the range from the greatest thickness you will penetrate to the least depth at which it is necessary to detect discontinuities.

Scanning—In scanning, you must use enough water distance to keep higher order reflections out of the useful portion of the screen. There is one case where this is not possible—when the distance from the front surface to the discontinuity is considerably less than the distance between the front and back surfaces.

Multiple indications from the discontinuity will appear between the front and back surface indications if sufficient energy is reflected. The number of higher order indications will depend on the ratio of the distances.

Angulation is important in the immersion method. A variation of ½-degree is detrimental at high frequencies. Where the geometry of the piece precludes back reflections, the operator must adjust the sweep control so the screen will show full thickness of the material being inspected.

Speed of Scanning—In pulse-echo equipment, a burst of energy leaves the searching unit every 1/60 to 1/1000 of a second. Between pulses, the receiver is receptive to returning echos. A measurable amount of time is required for the energy to travel through the water, the part and back to the searching unit.

The searching unit must not have traveled a greater distance than the effective length of the crystal before this round trip of ultrasonic energy has taken place. The scanning rate is determined by the geometry of the part, the pulse repetition rate of the instrument and the size of the searching unit.

Alarm Systems — When a fast scanning rate is used (2 ft per second or faster), a monitor or alarm system should be used. At these high speeds, it is impossible for the operator to follow the rapidly changing screen pattern.

A monitor works well on regularly shaped articles but is difficult to use on complicated shapes. Because of changes in contour, back reflections from two metal thicknesses may occur simultaneously. The monitor cannot distinguish whether the indication is from a discontinuity or a back surface.

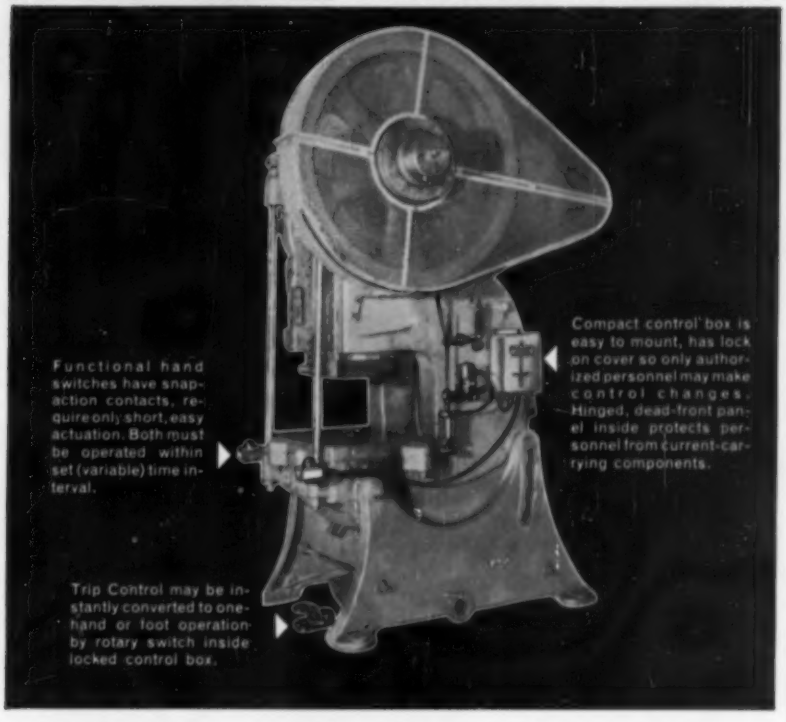
Interpreting—The operator must determine from his screen whether the indication from a discontinuity should signal rejection of that part. If rejections are made on a straight line basis, the operator need only observe whether the indication exceeds a predetermined level (distance above the base line on an A-Scan).

An A-Scan presents the data as vertical deflections on a cathode ray tube. Those which deflect both above and below the base line are called RF patterns. Those that deflect above only are called Video.

B-Scan — Where data are presented as a sectional view of the

MICRO *precision switches*

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN


Functional hand switches have snap-action contacts, require only short, easy actuation. Both must be operated within set (variable) time interval.
Compact control box is easy to mount, has lock on cover so only authorized personnel may make control changes. Hinged, dead-front panel inside protects personnel from current-carrying components.
Trip Control may be instantly converted to one-hand or foot operation by rotary switch inside locked control box.

Increase production...3 ways... with MICRO SWITCH Trip Controls

MICRO SWITCH Trip Control will speed production and provide safety to the operator and equipment on any power machine that will lend itself to two-hand control.

1 Less operator fatigue: Simple direct operating motions, feather-touch finger-tip operation of the control switches, and the absence of gates, harnesses or sweeps keep the operator fresh and alert.

2 Increased operator confidence: Without worry over personal safety, operators soon develop a smooth, time-saving "load," "trip," and "unload" sequence.

3 Instantaneous electrical actuation of the clutch: Saves time on every operation.

Outstanding safety features

Reduces chance of accidental operation. Operation can result only when control system is functioning properly. The control becomes inoperable if a component fails.

Control cannot be "cheated" for even one stroke: If one switch is tied down or broken, the control will automatically kick out.

Interlock prevents accidental power stroke during set-up. Operators, set-up men, and expensive dies are protected during set-up. The interlock prevents an unexpected stroke when the motor is started up again.

MICRO SWITCH Trip Controls have wide range of uses

These controls offer a choice of desirable single-stroke control for positive mechanical clutch machines and automatic cycling control for friction clutches and hydraulic and pneumatic equipment.

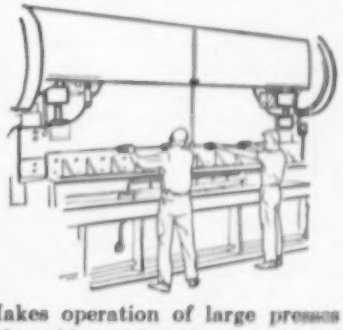
FOR SMALL PRESSES

Provides fast, safe, effortless operation of small two-hand presses, riveting machines, etc.

ONE HAND—IF NECESSARY

Where one hand is required to hold stock in a protected or enclosed die, control is quickly converted to one-hand operation.

FOR USE ON LARGE PRESSES



Makes operation of large presses safe and less tiring. Any number of operator stations may be "wired into" the control circuit.

SEND FOR CATALOG 65 TODAY
Gives complete description of all controls and clutch actuating equipment.

There is a MICRO SWITCH Trip Control distributor near you. Write us for his name and address.

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area being scanned, it is designated B-Scan. A-Scan presentations are most widely used and are more sensitive in evaluating the size of the discontinuity.

It is almost impossible to quantitatively determine the size of a defect by ultrasonics. Comparison with reference blocks is the method most widely used, but it usually can be assumed that the defect which gives an indication height equal to that from a flat bottomed hole at the same depth will be larger, since the flat bottomed hole is the better reflector.

Distance—Using the straight line method of rejection does not take into account the effect of distance. Fig. 3 shows a part containing discontinuities of equal size at various depths. At the right is a plot of height of indication from the discontinuity as a function of distance.

It can be seen that as the depth of the defect increases, the height of indication on the cathode ray tube screen increases to a maximum and then decays exponentially.

The portion of the curve to the right of maximum is called the far field and represents true attenuation except for effect of geometry. The extent of the close-field zone varies principally with frequency and crystal size.

Correcting — Reference blocks varying in length but containing flat bottomed holes of the same size are used to correct the effect of distance. Alcoa ultrasonic standard reference blocks, Series B (or similar blocks produced by the Ultrasonic Testing & Research Laboratory, Van Nuys, Calif.), are available for this work.

It is possible to superimpose the curve obtained from the reference blocks on the screen of the ultrasonic instrument. The operator needs only to note whether a discontinuity indication exceeds the curve. Where automatic scanning with a monitor is used, the curve can be incorporated into the monitor.

Advantages—There are four advantages of the immersion method of ultrasonic testing:

1. It permits inspection of parts with relatively rough surfaces. In contact testing, rough surfaces can cause excessive wear of searching units, and, in some cases, sufficient ultrasonic energy may not enter the part for a proper test.

2. It permits the use of high test frequencies. Close-to-the-surface inspection dictates the use of high frequencies. Smaller discontinuities can be detected by high frequencies. The use of high frequencies with the contact method is limited because of the thinness and fragility of crystals cut to resonate at high frequencies.

3. It permits easy scanning of the article; a mechanized installation can be used. Complete inspection of a regularly shaped article can be done in a minimum of time.

4. It permits angulation of the ultrasonic beam, so it can be directed normally into fillets (these are often inaccessible with the contact method). Since the beam can be readily angulated, maximum energy can be reflected from defects lying on an angle other than parallel to the surface.

Disadvantages—One feature of the immersion method that is sometimes a disadvantage is that the part must be immersed. This is not always convenient or possible. The jet stream or liquid schnozzle devices eliminate this requirement.

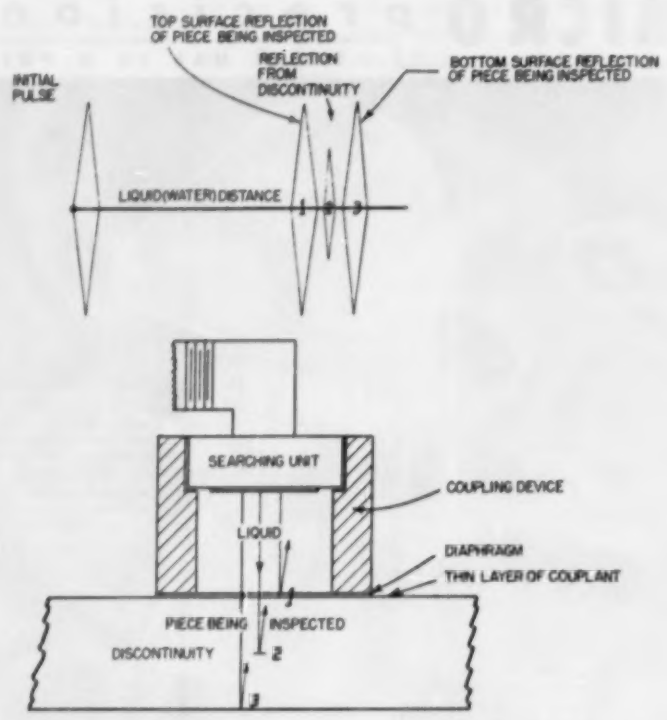


Fig. 4—Liquid coupling device in position for inspection and a typical screen pattern of a test

Fig. 4 shows a liquid schnozzle device, a cylinder filled with suitable couplant. A searching unit is fixed at one end; the other end rests on the surface of the test part. This device can be used with or without a diaphragm to retain the liquid in the cylinder. The same screen pattern is the same as the immersion method.

The immersion method of ultrasonic testing is applicable to a great variety of products. It lends itself to rapid inspection of regularly shaped objects but is flexible enough to permit inspection of many complex shapes. But it does not entirely replace the contact method. There are still many inspection jobs which can be satisfactorily, conveniently and more practically done by the contact method.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

In Taconite processing plant, ANACONDA Interlocked-armor cable is used for feeder line . . . resists weather and industrial hazards.

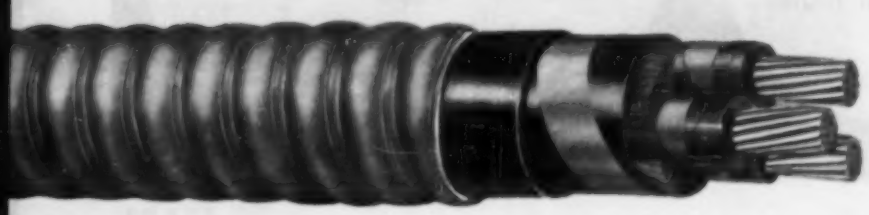
New cable puts power where you want it—fast!

With ANACONDA Interlocked-armor cable you bring power to new load centers faster—change plant layout quickly, or add new facilities in a hurry!

It is economical—installed fast—indoors or out—with simple supporting devices . . . trained easily around corners, columns and other obstructions in long unbroken runs. Circuits are easy to relocate . . . always accessible. And this cable's interlocked metal-tape armor affords high mechanical protection against all types of damage.

The Man from Anaconda, or your nearest Anaconda distributor, will be happy to give you full information. Or write to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

ASK THE MAN FROM ANACONDA® FOR INTERLOCKED-ARMOR CABLE



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Dieing Machine Cuts Costs with Progressive Dies

This line of automatic double crank machines uses progressive dies, which combine complex stamping and forming operations.

Coil or sheet metal is fed through roll feeds to a series of die stations where piercing, blanking, forming and other operations are done with each stroke. After the first part is ejected, each stroke of the machine produces a finished part.

The machine applies pressure through two crankshaft connections in the base. A more even distribution of force over a longer bed area is provided.

The machines are designed to make stampings that need large bed areas but not necessarily heavy tonnage capacities. Strength is provided for turning out parts by progressive stamping methods when eccentric loading demands extra rigidity.

The lower and upper base are separated by vibration and noise absorbing material. Box gearing is incorporated in the roll feed, so that when the roller is raised, the stock gearing remains meshed.

Models range from 25 to 500 tons in capacity (rated near the bottom of the stroke). *Write*: Henry & Wright Division, Emhart Mfg. Co., Hartford, Conn. *Phone*: Chapel 9-6514

Precision Borer Does Machining and Assembly

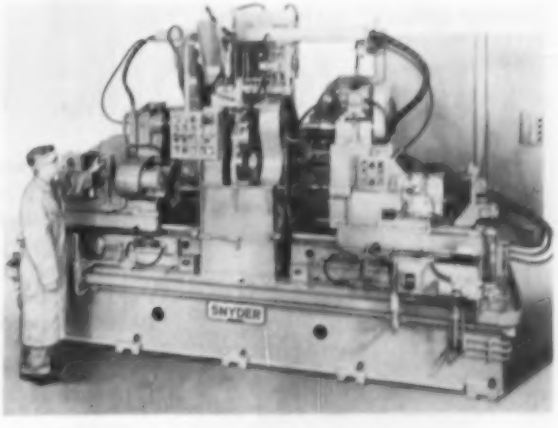
This 6-station, trunnion-type borer machines die-cast electric motor end shields and assembles a bushing in the center hole. Production rate: 350 pieces an hour at 75 per cent efficiency.

A rotary hopper feed directs split babbitt bushings to a plunger for press-fit assembly into the part at the fourth station. Deflection of the motor end shield during assembly is prevented by a hydraulic stop which advances to within 0.0003-in. of the back face of the part.

All machining operations on parts in the five machining stations are simultaneous. At each index, a part is unloaded from the first station, and another part is loaded in and chucked before the cycle start button is pressed.

The machining cycle on the hydraulically operated, electrically controlled machine is entirely automatic. Indicator lights on the control panel show the operating condition of each machining function.

Air-oil mist lubrication is provided for the precision boring spindles which are motor driven through V-belt drives.



The two-way machine has six spindles. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone*: Lorain 7-0123

NEW PRODUCTS and equipment

Fork Lift Truck

The U-60 is powered by a 226-hp engine and has power steering as standard equipment. The truck lifts up to 6000 lb.

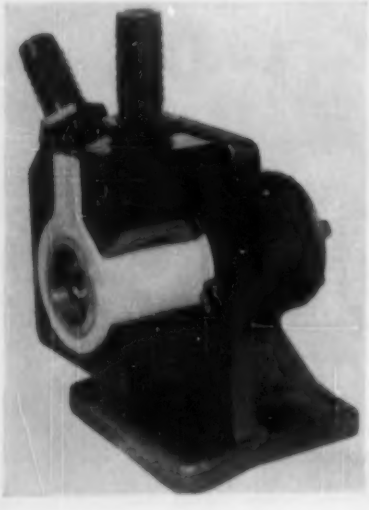
Awkward loads are handled easily; the telescoping mast has a 9-in. free lift with a tilt of 10 degrees forward and 4 degrees backward.

There are four speeds in either forward or reverse. Top speed is 20 mph. *Write*: Truck-Man Division, Knickerbocker Co., Jackson, Mich. *Phone*: State 2-7181

Pump Liner

The Kel-F elastomer liner permits pumping of highly corrosive products under severe conditions.

Strong oxidizing acids, mineral acids, alkalies, aliphatic solvents, some chlorinated solvents, various fuels and hydraulic fluids can be handled.



The liners are for pumps with capacities of 1/3 to 5 gpm. *Write*: Vanton Pump & Equipment Corp., division of Cooper Alloy Corp., 201 Sweetland Ave., Hillside, N. J. *Phone*: Waverly 6-2435

Scanning Spectrometers

Model 8200 is a grating-type spectrometer that gives first order reciprocal linear dispersion of 16 angstroms per millimeter at the exit s lt, with a minimum resolution of 0.2 angstroms.

The unit is easily adapted for use as a flame spectrometer capable of detecting impurities to one part per billion. *Write*: Jarrell-Ash Co., 26 Farwell St., Newtonville 60, Mass. *Phone*: Decatur 2-2130

Electric Tractor

Front-wheel steer and rear-wheel drive are featured by this heavy duty electric tractor. It has a normal draw bar pull of 600 lb and a maximum pull of 1600 lb.

Turning radius is 62 in. Top speed is 6.2 mph. Any type of coupling can be attached to the rear end of the tractor. *Write*: Department R-25, Lewis-Shepard Products Inc., Watertown, Mass. *Phone*: Watertown 4-5400

Die Steel

Moldtem is a chromium-molybdenum-vanadium die steel made in blocks and bars for plastic molds and zinc diecasting dies.

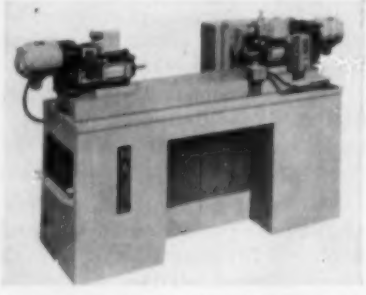
The steel is prehardened and ready for use without further heat treatment. Brinell hardness range is 302 to 341. When desired, the steel will take superficial surface hardening, such as nitriding, carburizing or chrome plating. *Write*: Heppenstall Co., 4620 Hatfield St., Pittsburgh 1, Pa. *Phone*: Mayflower 1-2000

Double End Machines

Drilling, tapping and other end-cutting tool operations are done by these machines.

The machines incorporate two flexible tool feeding devices that use shop air line pressures for thrust and self-contained sealed hydraulic systems for spindle travel control.

Rapid travel movements, feed



rates and stroke lengths are adjustable in both the advance and retract motions. Maximum stroke length per unit is 4 in. Spindle speeds range from 190 rpm to 10,000 rpm.

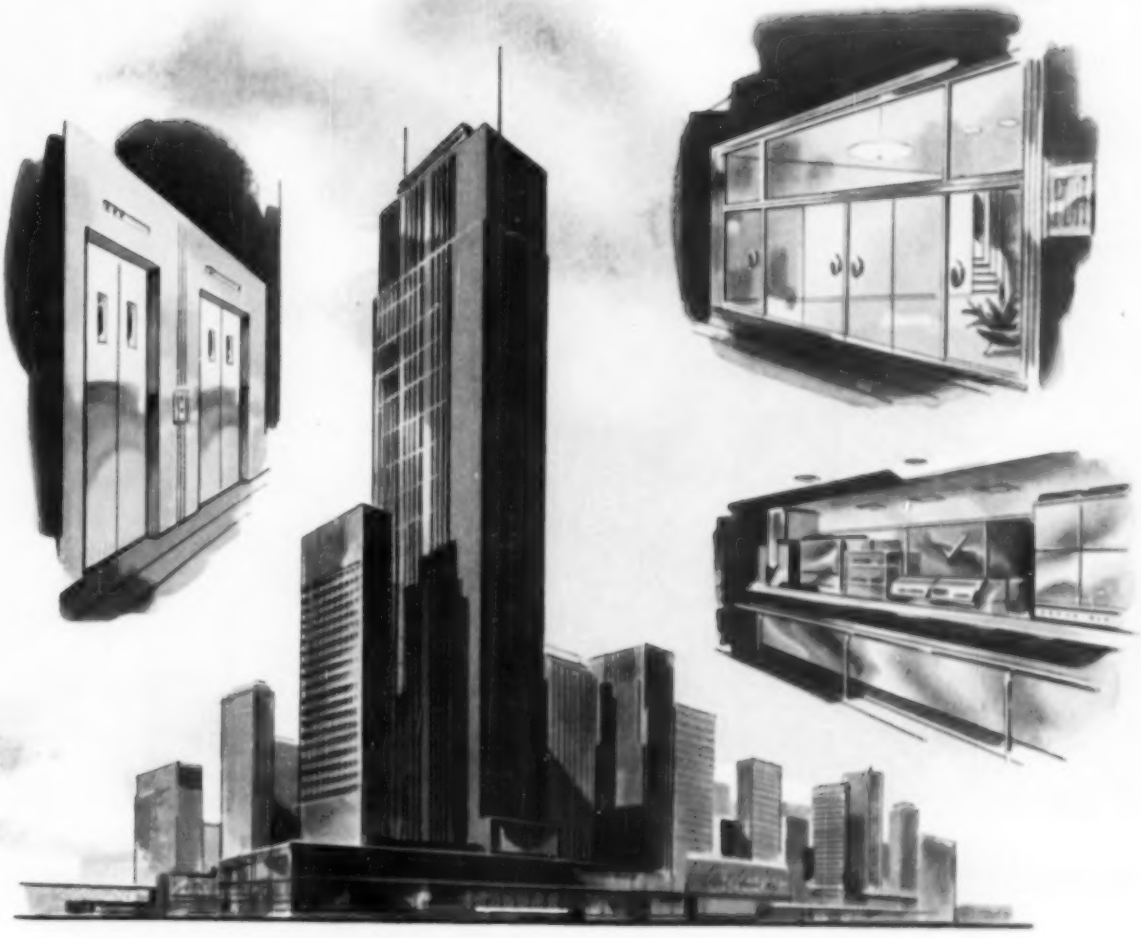
The long, wide top of the machine base allows positioning for the machining of holes that are opposed, offset, angular and up to 35 in. apart. *Write*: Hause Engineering, Montpelier, O. *Phone*: 5-3158

Gear Finishing

The two-station Duplex Burr-Master deburrs and chamfers both sides of gears or splines simultaneously. Different parts can be handled on each station.

Each station has an output rate of up to five teeth a second. Spur gears, helical gears and straight sided or involute splines can be handled.

The entire tooth form, including the root of both sides of the gear or spline, is completely deburred and chamfered. The depth of



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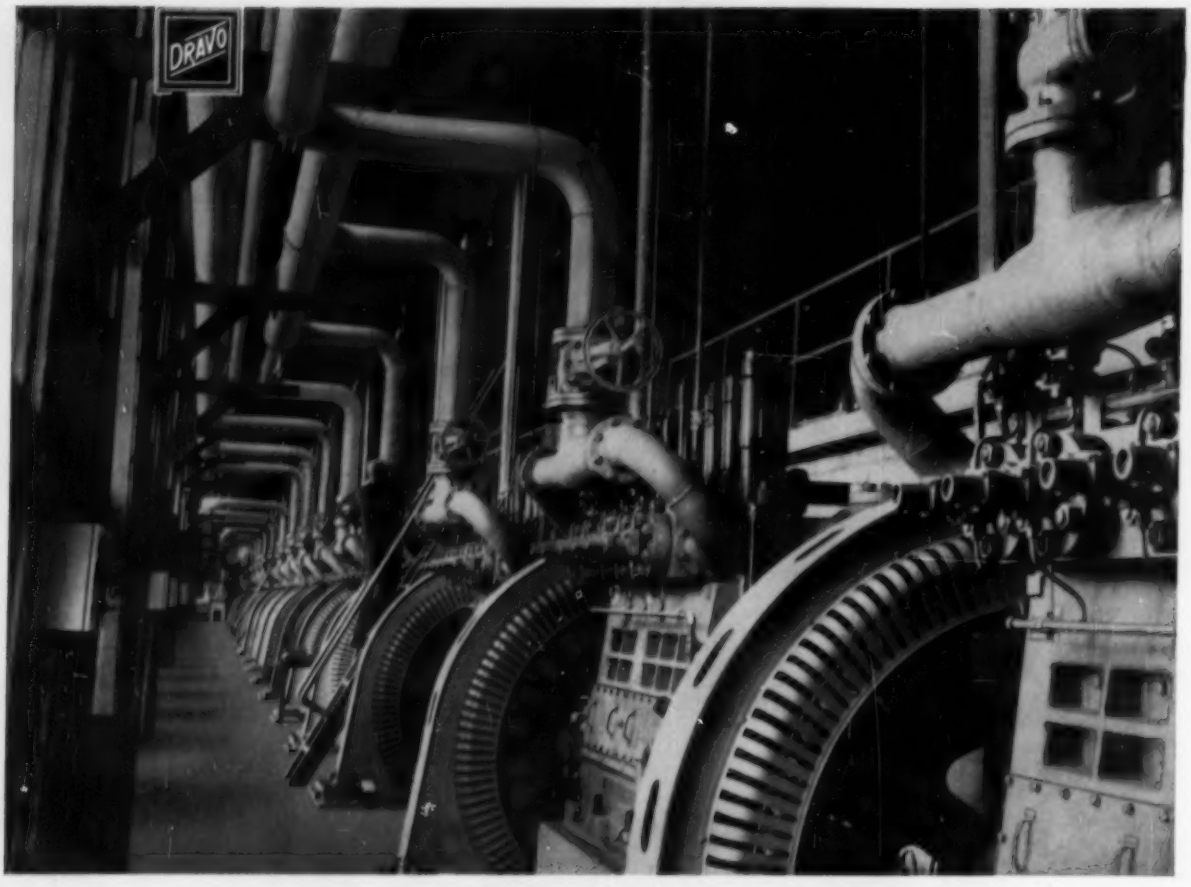

Special Piping Feeds Shell-Forming Presses

Water at a pressure of 2500 pounds per square inch is carried from this battery of 24 pumps to hydraulic shell-forming presses at the Government's new Scranton, Pennsylvania, Ordnance Plant. A mile-long network of piping, fabricated and installed by Dravo, is a vital link in the manufacture of 155-millimeter and 8-inch shells.

Because of varying demands from the presses, special "shock" equipment was installed to reduce vibration and smooth out jolts in the system. The result is safe, smooth and continuous production for the plant's operator, United States Hoffman Machinery Corp.

This piping installation is another example of how Dravo has been serving business and industry in many engineering fields for more than 60 years, with customer satisfaction considered essential in every transaction. DRAVO CORPORATION, PITTSBURGH 25, PENNA.

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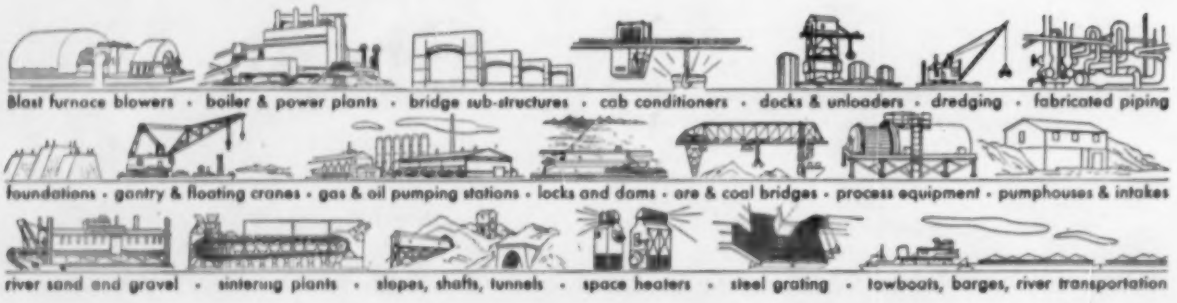
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NEW PRODUCTS and equipment

chamfer is infinitely adjustable.

Model BMED-24 has a work range from 0.625 to 6.5-in. pitch diameter. Model BMED-29 handles work from 3 to 9.5-in. pitch diameter. *Write*: Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. *Phone*: Webster 3-7280

Saw Sharpener

The G-45 sharpens circular metal cutting saw blades from 8 to 45 in. in diameter. Varying thicknesses, rake angles and pitches can be ground. Alternating high and low teeth are ground with one setting.

The high tooth is chamfered on both sides, and the following tooth

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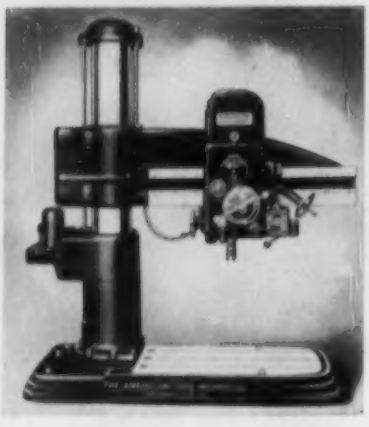
is cut square. The narrow tooth roughs out the center, and the wide tooth finishes the cut. *Write*: Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland, O. *Phone*: Utah 1-1515

Radial Drills

A fine feed boring attachment on this company's 9 and 11-in. column drills is used for precision boring.

The feed range is one-fourth of the standard range. Speeds from



0.001 to 0.00625-in. per spindle revolution are supplied. The change from standard to fine feed is made instantly by a lever. *Write*: American Tool Works Co., Pearl St. & Eggleston Ave., Cincinnati 2, O. *Phone*: Parkway 1-2800

Precision Boring

Boring, turning, grooving, chamfering and facing of medium and small parts are operations for the 2112-B borer.

This high production machine

can be arranged to do a wide variety of toolroom work and short production runs. Flexibility is added by selective cycle equipment, a variable speed drive and a universal fixture.

A vertical slide can be mounted parallel, or at right angles to the spindle.

Maximum table travel is 12 in. Table feeds range from ½ to 130 ipm. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Saw Table Guard

The Tensee is a safety guard for metal cutting circular saws. Made of clear Plexiglas, it lets the operator see the work while sawing.

The guard is made with a special taper so that the work can be held less than ¾-in. from the blade on either side. *Write*: Brett-Guard Co., division of Glenwood Industries Inc., 105 S. Dean St., Englewood, N. J. *Phone*: Lowell 8-2600

Heat Exchanger

This impervious graphite heat exchanger both heats and cools nickel plating solutions.

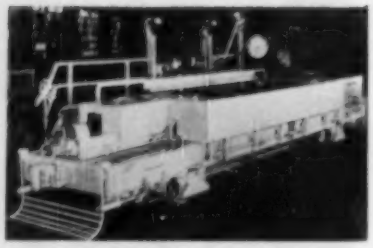
It resists mechanical shock and accommodates pressures of 150 to 200 psi at temperatures up to 340°F.

Seven models (single or double pass) have heat transfer areas from 21.2 to 187.5 sq ft. *Write*: Falls Industries Inc., Aurora Rd., Solon, O. *Phone*: Churchill 8-5357

Scale Car

This blast furnace scale car contains two 160-cu-ft bins which are air operated. The unit is self-propelled by two direct current motors at speeds up to 500 fpm with a full load.

Weighing equipment consists of

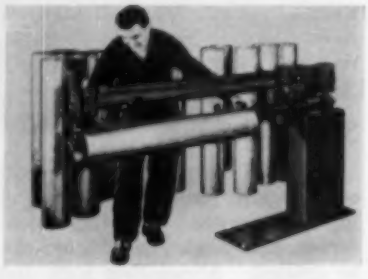


an automatic recording scale which, at the press of a button, weighs the bin loads and records them on tape.

Since the unit operates under ore, coke and limestone stock bins, it is equipped with headlights and floodlights to illuminate the bins. *Write*: Pennsylvania Engineering Corp., New Castle, Pa. *Phone*: Oliver 4-5511

Grooving Machines

Model 48-U is a universal power machine that has a multipurpose horn for closing both single and Pittsburgh lock seams.



Adjustable stops hold work stationary on the horn; adjusting wheels enable close regulation of roll pressure to conform to the thickness of the material.

The machine has a single lock seaming capacity of 20 gage mild steel and a Pittsburgh lock seaming capacity of 18 gage mild steel. Nominal working length is 48 in. *Write*: Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. *Phone*: Taylor 4070

Transfer Conveyor

Model 400 is an elevating conveyor for transferring long cylindrical parts from one production machine to another. It accepts parts in a rolling position from the discharge chute on the first machine, elevates them and delivers them to the magazine of the next machine.

The delivery rate is adjusted to

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...anything that can be made of steel sheets can be made of

Now we are not suggesting you fabricate a violin out of Wheeling SOFTITE. But it is reassuring to know that *if you wanted to,* here is one sheet that can take every bend, every fold, every intricate turn without peeling or flaking.

Incredible? Amazing? That's Wheeling SOFTITE... the tightest coated sheet yet produced. So tight-coated, in fact, you can use it to make *anything* you can make out of steel sheets.

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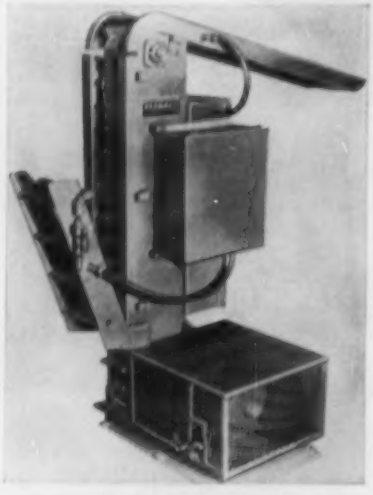
the second machine. A bank control shuts off the first machine if it is feeding faster than the second machine can handle parts.



Parts from ⅜ to 1¼-in. in diameter and up to 12 in. long are handled by the machine. *Write*: Feedall Inc., Willoughby, O. *Phone*: Willoughby 2-8100

Vertical Motor

Type HV is a solid shaft motor built to the new NEMA standards. Size range: 1 to 30 hp. Standard units are built for 3 phase, 60 cycle, 220/440 volt, ac operation.

A split dome, cast iron conduit box provides easy access to motor leads.

Both "C" and "P" NEMA bases

are available. Rotors are electronically balanced. Motor windings are protected by an asbestine compound. *Write*: U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif. *Phone*: Adams 3-3131

Tube Testing

Magnatest FW-400 eddy current instruments detect seams and other discontinuities in nonmagnetic tubes and rods.

The instruments can be used on aluminum, magnesium, copper, brass, bronze, tungsten and stainless steel. Small diameter wire and material up to 3 in. in diameter can be inspected. *Write*: Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000

Speed Lathes

These vertical and horizontal chucking lathes do deburring, polishing, blending and other secondary operations in the finishing of aircraft and automotive parts.

Units can be supplied with single, multiple and variable speed motors. For starting and stopping several times a minute, electric brake motors are used.

A foot pedal operates an air chuck and motor in proper sequence. Hand chucks can be used. Spindle speeds are furnished to fit the customer's application. *Write*: Standard Electrical Tool Co., 2504 River Rd., Cincinnati 4, O. *Phone*: Grandview 1-6200

Barrel Finisher

The model V-8 has a total capacity of 8 cu ft. It is available in any interchangeable combination of 2, 4, 6 or 8 cu ft barrels.

The motor is at the rear of the

machine away from water splash. A wire mesh guard lifts up and back to make it easy to get at the barrels. *Write*: Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, O. *Phone*: Mulberry 1-2800

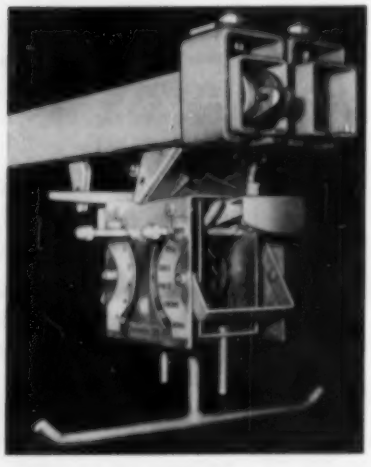
Production Grinder

The 4B61 Bowgage is a completely automatic integral grinding unit with gaging, rough and finish feeds. It comes in two sizes—10 x 24 in. and 10 x 36 in.

Maximum swing over the table is 10 in.; the maximum diameter grind is 6 in. Headstock speeds range from 50 to 600 rpm. *Write*: Van Norman Machine Co., Springfield 7, Mass. *Phone*: Republic 7-4721

Automatic Dispatching

The Twin-Trak is an overhead automatic dispatch system that controls the movement of parts to production and storage areas.



Component parts from individual storage banks or lines can be supplied to each workstation automatically.

The system is a compact, flexible unit that is quickly, easily

Stainless gutter and downspout fabricated by Long Island Tinsmith Supply Corp., Richmond Hill, N. Y.
why roof drainage systems of
STAINLESS STEEL
LOOK BETTER
LAST LONGER
COST LESS

Stainless beauty is *lifetime* beauty—it won't rust, chip, discolor or stain walls as many other metals do. • And stainless is *strong*. It doesn't sag or bend under heavy deposits of ice and snow. And its exceptional wear and corrosion resistance means it stays on the job in spite of years of abrasion from gravel and debris, or the corrosive action of dead leaves. • These are reasons stainless is preferred by home buyers. It's first choice with fabricators, too, because it solders easily—is clean and simple to handle. • What's more, all these advantages come at a price which is competitive with ordinary materials—actually lower than some metals in common use. Call or write now for more details. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

Why TECUMSEH Compressor Crankcases Are MICROHONED

"On Tecumseh compressors, we Microhone the piston bores. ***This gives us a running seal between pistons and bores which prevents gas leakage and eliminates the need for piston rings!*** Believe me, it takes a real combination of accuracy and functional surface finish to get results like that . . . and only Microhoning has given us that combination!"

(Tecumseh Products Company, Tecumseh, Michigan, is the world's largest producer of refrigeration compressors. Precision engineered and processed these units are hermetically sealed before leaving the factory.)

OTHER JOB DATA:

MATERIAL	Cast iron
PRECEDING OPERATION	Diamond finish-bore
MICROHONING OPERATIONS	One
STOCK REMOVAL	.0007" to .001"
FINISH	10 Microinches
TOLERANCES	
Diametric	.0003"
Roundness	.00015"
Straightness (Taper)	.00015"
HONING CYCLE	18 seconds, including fixture indexing time

"Here's our twin cylinder crankcase. The two piston bores in each case are opposite one another in the vertical plane, but they lie in two different horizontal planes. We simultaneously Microhone both bores in each crankcase, using a horizontal type machine with two opposing spindles."

"Although all of our crankcases are similar in design, the bores vary in diameter—1.312", 1.375", 1.500" and 1.625". Two fixtures on a two-position rotary indexing table let us Microhone one crankcase while another is being loaded. To run different bore diameters we just change the tools and gage rings. Switchover time is about five minutes."

Let a Micromatic Field Engineer show you how Microhoning will give you better functional finishes, closer tolerances and higher production.

☐ *Please have a Micromatic Field Engineer contact us.*

☐ *Please send literature and case histories on Microhoning.*

NAME_____

TITLE_____

COMPANY_____

CITY_____ ZONE____ STATE_____

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

NEW PRODUCTS and equipment

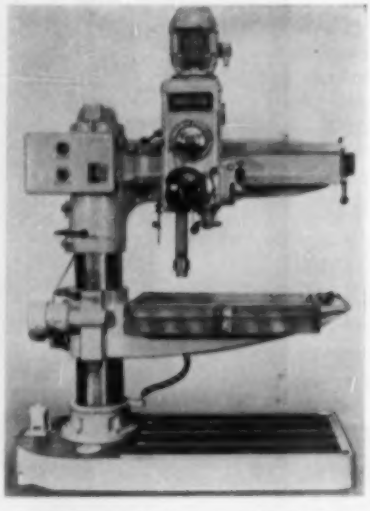
and economically installed. Track curves can be formed on a 2-ft radius.

Either mechanical or electronic selector controls are available. *Write*: Richards-Wilcox Mfg. Co., 174 Third St., Aurora, Ill.

Radial Drill

The Master has a fixed 3-ft arm which always remains at the same height and can be swung 360 degrees.

The workpiece is positioned by a motorized table which moves vertically on the 12-in. column. The table can be swung out of the way when the base is used for fixturing large workpieces.



Twelve spindle speeds (60 to 2100 rpm) are obtained through a preselector. The machine also does boring, reaming and tapping. *Write*: S&S Machinery Co., 207 Center St., Brooklyn, N. Y. *Phone*: Hyacinth 2-7400

Internal Contouring

Contours with curves, tapers, radiuses and square shoulders can be machined quickly and accurately with simple tooling when this attachment is used.

The tool mounts on a 60-degree angle to the spindle centerline on any face on the turret of a 3-A or 4-A lathe.

Contours with a diameter variation of 8 in. can be machined. A

NEW PRODUCTS and equipment

safety stop block prevents accidental contact between the tool and the opposite side of the work. *Write*: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O. *Phone*: Henderson 1-5580

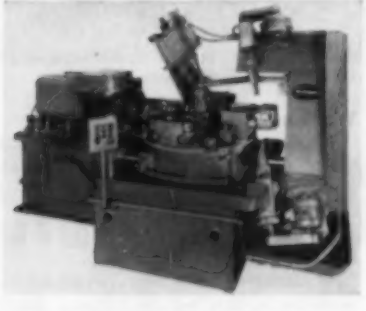
Welding Flux

Flux 6-20 is a dry welding material for applying nickel and cobalt-base hard facing alloys to iron and nickel-base alloys containing chromium, titanium and aluminum. The flux is also good for use on cast iron parts.

The flux contains no glare producing salts. *Write*: Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. *Phone*: Twinbrook 3-3800

Dial Type Machine

The Angle-Matic is a five-way angular and horizontal machine which processes exhaust manifolds for V-8 engines.



It mills locating pads, drills and reams the angular heat tube holes of 120 manifolds an hour.

Fixturing equalizes the stock around cored openings. *Write*: Michigan Drill Head Co., P. O. Box 4643, Detroit 34, Mich. *Phone*: Jefferson 9-4200

How MICROHONING Makes a Gas-Tight Running Seal Without Piston Rings

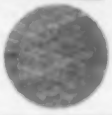
A leak-free, running seal between bores and pistons—without the use of rings—is possible only when the processing method generates diametric and geometric accuracy and the required functional surface finish. These characteristics are simultaneously obtained by the Microhoning process. Here's how:

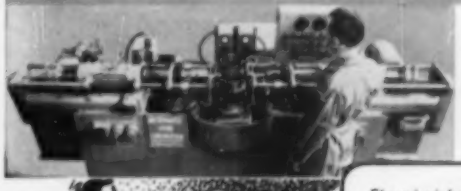
1 The sticks of abrasives in the tool form an abrasive "cylinder" and are fed out radially with equal pressure in all directions. High spots and tight areas in the bore are abraded first.

2 The long abrasive sticks cut only on the crests of wavy or snaky surfaces until the bore has the same diameter throughout its full length.

3 The combination of tool motion (rotation and reciprocation) and feed pressure fractures the abrasive grits that have become dull, and new sharp edges are formed; the clean constant cutting action of every stroke on the full bore length consistently generates the desired surface finish.

One of the exclusive advantages of Microhoning is its ability to produce whatever functional surface characteristics are required for maximum product performance. Microhoning's cross-hatch pattern, with its myriad of minute intersecting "valleys," furnishes an excellent surface for retention of lubrication.





"Here's one of two Micromatic Model 523-2 machines used on the compressor crankcase job. Tecumseh uses a total of 18 Microhoning machines on other vital processing operations."

The principles and applications of Microhoning are thoroughly explained in an informative 16mm., 30-minute sound movie, "Progress in Precision." We'll be glad to reserve a print for your use. Just tell us on the coupon the date you'd like to see it.

☐ Please send me "Progress in Precision" in time for showing on _____ (date)

☐ Please send literature on Microhoning. I am interested in the following application: _____

NAME _____

TITLE _____

COMPANY _____

CITY _____ ZONE _____ STATE _____

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

NEW Literature

Write directly to the company for a copy

Electric Heaters

Catalog 27-620, 32 pages, describes industrial electric heating units and devices. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Fork Lift Trucks

This 32-page bulletin describes a line of lift trucks with capacities from 6000 to 11,000 lb. A guide to efficient operation is given in a pocket-size operator's manual. Automatic transmissions are discussed in a folder. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, O.

Oxygen Sampling

Sampling and recording equipment for continuous O_2 analysis of open hearth waste gases is presented in a 4-page data sheet, 643(5). Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.

Hydraulic Hose

A slide chart contains latest SAE and industrial specifications for hydraulic hose. Wiretex Hose Department, Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O.

Cam Followers

Bulletin 103, 8 pages, gives specifications, load and life ratings of cam followers and cam yoke rollers. Smith Bearing Co. Inc., 23 Bear Tavern Rd., West Trenton, N. J.

Seamless Rings

This 16-page bulletin lists seamless forged and rolled steel rings from 1 to 145 in. in diameter. Alco Products Inc., Box 1065, Schenectady, N. Y.

Coolants

A program for keeping machines that use water soluble metalworking solutions clean is presented in an 8-page folder. F. E. Anderson Oil Co., Portland, Conn.

Unified Screw Threads

A 4-page folder gives a quick explanation of these threads and cites their profile origins. Cleveland Cap Screw Co., Box 579, 2917 E. 79th St., Cleveland 4, O.

Dividing Collet Head

A universal dividing head featuring interchangeable index plates in a range of 2 to 36 spaces is covered in a 4-page bulletin. Kuma Tool Co., division of Production Tool Corp., 4712 S. Kenwood Ave., Chicago 15, Ill.

Roll Grinders

Bulletin V-56, 26 pages, describes machines that will grind rolls from 45 to 82½ tons. Landis Tool Co., Waynesboro, Pa.

Barrel Finishing

Methods and materials used in barrel finishing are discussed in a 6-page bulletin. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Thin-Wall Tubing

Uses of large diameter, thin-wall tubing are given in bulletin 4, 5 pages. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Industrial Wastes

Bulletin 315-111, 8 pages, outlines equipment for use in industrial waste treatment. Department PR, Chain Belt Co., Milwaukee 1, Wis.

Shafting

A 4-page bulletin describes hardened and ground shafting that eliminates problems of warping and straightening. Thomson Industries Inc., Manhasset, N. Y.

Roof Ventilators

Engineering data on a line of roof ventilators are given in bulletin A-112A, 16 pages. Hartzell Propeller Fan Co., Piqua, O.

Wound Rotor Motors

Bulletin 51B8195A describes motors for fans, blowers, hoists, lifts, cranes, machine tools, presses, conveyors, crushers and mills—6 pages. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Guide Pin Bushings

Information to help you select guide pin bushings for die sets is given in bulletin 56, 6 pages. Detroit Die Set Corp., 2895 W. Grand Blvd., Detroit 2, Mich.

Wrought Aluminum

Corrosion behavior of wrought aluminum alloys is analyzed in a 72-page booklet. Customer Service Division, PR-956, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.

Military Production

Facilities for research, development and production in the fields of fire control, navigation, bombing, precision gearing, electronics and computers are presented in a 12-page bulletin. Mechanical Division, General Mills Inc., 1620 Central Ave., Minneapolis, Minn.

Transite Pipe

A 48-page booklet tells how to install Transite pressure pipe for overhead industrial water and process lines. Johns-Manville, 22 E. 40th St., New York 16, N. Y.

Thermosetting Adhesives

A series of adhesives for bonding ferrous and nonferrous metals is described in a 30-page bulletin. Adhesives Division, U. S. Stoneware Co., Akron 9, O.

Vapor Degreasers

A 24-page bulletin describes use, operation and maintenance of all types of vapor degreasing equipment. Degreaser Division, Circo Equipment Co., 51 Terminal Ave., Clark (Rahway), N. J.

Carbide Tool Grinding

A 4-page bulletin describes abrasives for grinding carbide tools. Department 74, Robertson Mfg. Co., P. O. Box 848, Trenton 5, N. J.

Industrial Insulations

A 4-page folder, I-F 46, describes water base adhesives and protective coatings for industrial insulations. Industrial Products Division, Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y.

High Strength Steel

A steel bar that has high strength without heat treating is described in a 20-page booklet. La Salle Steel Co., 1420 150th St., Hammond, Ind.

Steel Tubing

Tubing for hydraulic cylinders and fluid lines is presented in bulletin 12-6, 8 pages. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Barrel Finishing

A 52-page catalog presents equipment and supplies for barrel finishing. Almco Division, Queen Stove Works Inc., Albert Lea, Minn.

Welding Helmets

Glass fiber helmets are discussed in a 4-page bulletin, 0303-4. Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Precision Tumbling

Multibarrel tumbling equipment is depicted in this 8-page bulletin. BMT Mfg. Corp., 110 E. Ninth St., Elmira Heights, N. Y.

Thread Cutting

A 4-page bulletin presents a toolholder for fast single-point threading on reversible engine or turret lathes. Easco Products, P. O. Box 587, Ypsilanti, Mich.

the bright spots

in any automobile picture

FUNCTIONAL AND DECORATIVE TRIM OF

stainless steel

BRIGHTWORK of time-proved *stainless steel* sparkles invitingly on the car dealer's floor . . . shines as it serves, year after year . . . gleams like new when the car is old! For built-in luster that foils corrosion, plus super-strength to resist dents and scratches, design and specify STAINLESS STEEL . . . the quality metal that speeds acceptance of your cars—on *first sale and resale!*

Superior

stainless strip steel

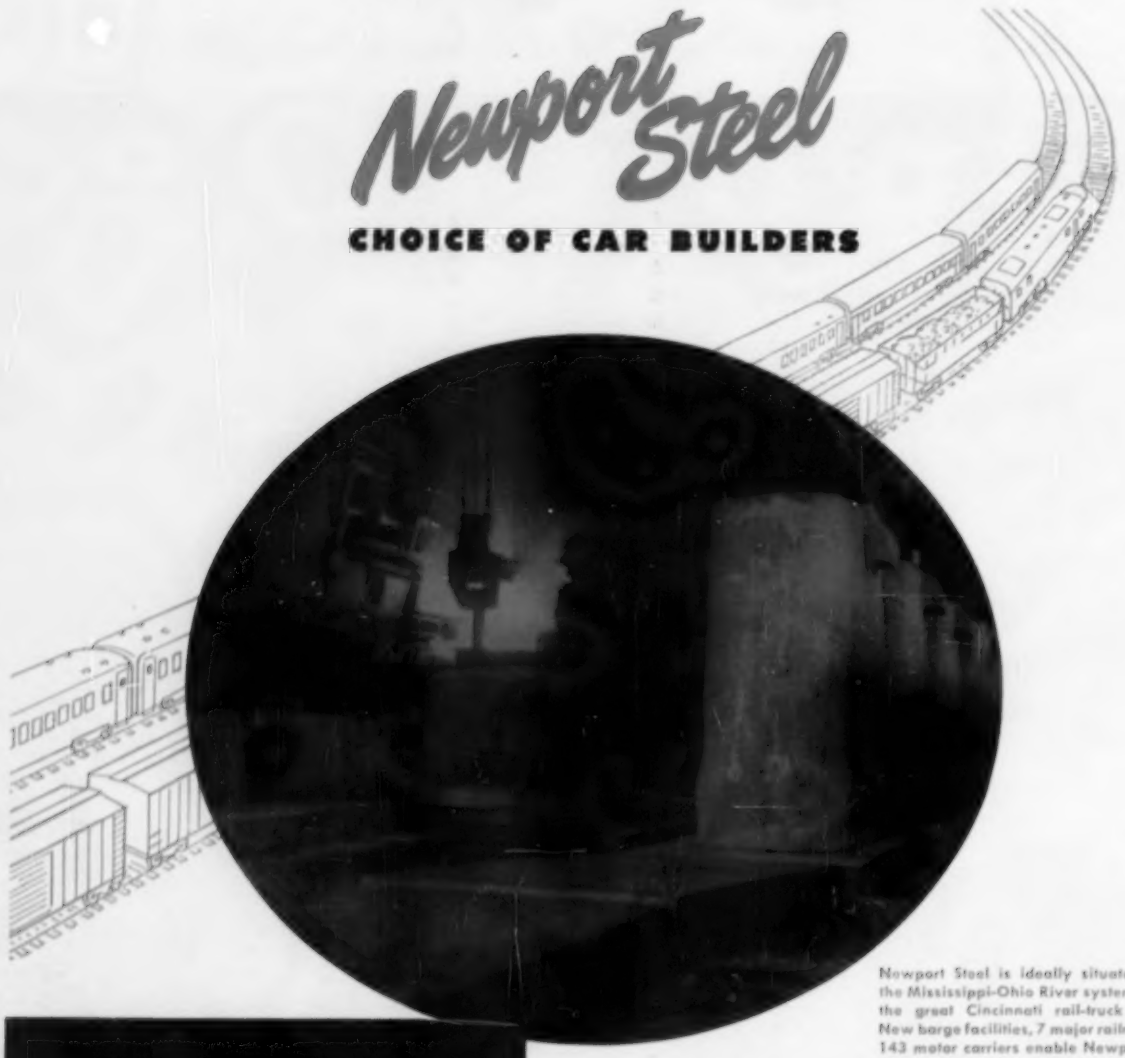
Superior Steel

CORPORATION

CARNEGIE PENNSYLVANIA

Newport Steel

CHOICE OF CAR BUILDERS



Freight and passenger cars now being added to railroad rolling stock include sizable tonnages of Newport steel, for frames, floors, siding, windows and doors. Another example of the versatility of Newport production! Modern equipment and methods combine with 70 years' steelmaking skill to provide the best product and service ever offered by Newport . . . always to the buyer's exact specifications. Location in the heart of America's greatest industrial growth makes Newport an especially attractive source of supply. Discuss with us your need for any of the products listed below.

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads, 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

PRODUCTS OF NEWPORT STEEL . . . . . **Cold-Rolled Sheets • Hot-Rolled Steel in Coil • Hot-Rolled Pickled Steel in Coil • Hot-Rolled Sheets Hot-Rolled Pickled Sheets • Electrical Sheets • Alloy Sheets and Plates • Electric Weld Line Pipe • Eave Trough and Conductor Pipe • Culverts**

STEEL

August 27, 1956

Market Outlook

ONE ROUND of steel price increases is hardly completed before conditions arise that may force another.

New pressure stems from soaring prices of ferrous scrap and the danger of having to get iron ore next winter and spring via railroad. Scrap and iron ore are the two basic sources of metallics for the steel industry.

RECORD HIGH—Steel scrap is higher than ever before, and it's likely to stay high (see STEEL, July 30, p. 135), particularly if there's a squeeze on the ore supply. The all-time high puts STEEL's price composite at $58.17 a gross ton for the week ended Aug. 22. This is up $1.50 over the preceding week's level, itself a record high. Since this year's low point of $45.50 in the midst of the steelworkers' strike, the composite has shot up 28 per cent. A year ago, the composite was $44.33.

THREAT—The pinch on iron ore comes from the strike against some of the Great Lakes ore fleet. The boats have to deliver enough ore in summer to last through the winter, or else ore must come via rail, at higher cost. An early winter would hasten the predicament.

THE NEEDS—Consumption of scrap and iron ore promises to be heavy, for steel demand is shaping up to near-capacity operations during the rest of this year and into 1957.

Ordinarily, steel producers vary their ratios of scrap and iron ore usage in accordance with the price of scrap: A high price of scrap forces a reduction in the usage of scrap and an increase in the proportion of pig iron (it is made from ore). But ore could be in short supply before the lake boats sail next spring. So, a strong demand for steel would require a heavy dependence on scrap.

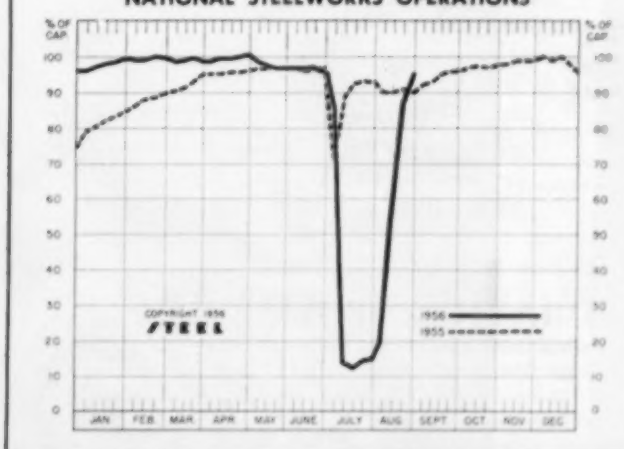
RESTRICTED—Steel producers will feel they have little room to absorb unexpected increases in costs. To minimize inflation, U. S. Steel Corp., pacesetter in this month's increases in steel prices, exercised restraint in making upward adjustments. Its price rise averaged $8.50 a ton. Most people had expected an increase of at least $10. Joseph L. Block, president of Inland Steel Co., Chicago, commented that this month's increases "will not offset the higher costs which will result from the recently concluded labor contract."

To meet soaring scrap costs, some electric furnace operators (scrap is their raw material) are adding a sliding scale extra to their steel prices.

OUTPUT JUMPS—In response to orders on the books, steel producers pushed ingot production up to 95.5 per cent of capacity in the week ended Aug. 26. This is a recovery of another 8.5 points since the steelworkers' strike.

INVENTORIES SHRINK—A surge in the demand for steel is expected when auto makers come into the market in earnest for material for their 1957 models. Consumers are not as well off inventorywise as they were at the start of the summer. Even though many of them took time off for summer vacations during the steel strike, steel consumption during the strike was undiminished. The Federal Reserve Board's seasonally adjusted index of metal fabricating in July was 171 per cent of the 1947-1949 average. Only one other month this year—April (171)—was that high.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Aug. 26	Change	Same Week 1955	Same Week 1954
Pittsburgh	98	+ 8	90.5	64.5
Chicago	97.5	+ 7*	95	66.5
Mid-Atlantic	96	+ 2	92	61
Youngstown	95	+ 5	100	63
Wheeling	95	— 1	96	70.5
Cleveland	101.5	— 0.5*	97.5	66.5
Buffalo	102.5	+ 10	105	56
Birmingham	85	+ 12	98	62
New England	90	0	70	52
Cincinnati	85.5	— 4	92	52.5
St. Louis	100	0	104	48.5
Detroit	90	+ 16	68	62.5
Western	99	+ 11	101	77
National Rate	96.5	+ 8.5	90	62.5

INGOT PRODUCTION‡

	Week Ended Aug. 26	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	145.7†	134.1	28.1	120.1
NET TONS (In thousands)	2,340†	2,154	419	2,186

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 41 Technical Outlook—p. 79

VANCORAM FERROCHROME-SILICON ALLOYS

PRODUCED UNDER STRICT QUALITY CONTROL...
PHYSICALLY CLEAN...UNIFORM IN QUALITY

Many years of manufacturing experience and careful attention to the steelmaker's requirements have resulted in these two distinctive ferro alloys.

LOW CARBON GRADE—This Vancoram alloy serves the dual purpose of adding chromium to stainless steel and recovering oxidized chromium from slag.

Chromium	39/42%
Silicon	40/42%
Carbon	.05% Max.

MEDIUM CARBON GRADE—This Vancoram alloy is recommended for adding chromium and silicon to low alloy steels and cast iron; its high solubility permits ladle or furnace addition.

Chromium	48/52%
Silicon	25/30%
Carbon	1.50% Max.

Contact your VCA representative for full information on Vancoram ferrochrome-silicon alloys and other Vancoram alloys.

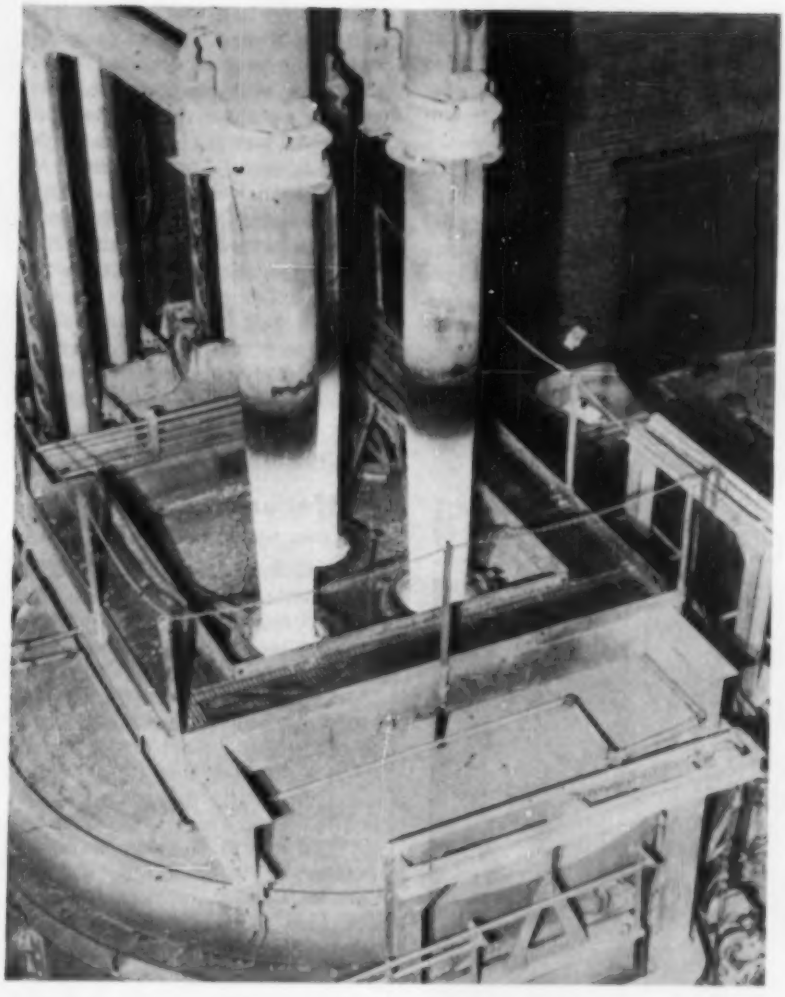
VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.
Pittsburgh • Chicago • Detroit • Cleveland

VANCORAM

Producers of alloys, metals and chemicals

50



The trend toward electric steelmaking furnaces makes . . .

Electrode Makers Confident

YOU can expect makers of furnace electrodes to come up with annual expansion announcements if electric steelmaking furnace capacity grows at the predicted rate of 1 million tons annually.

These manufacturers are optimistic about the long range and short term outlook. "Now that the steel strike is over, we feel that the last three months of this year will show a 20 to 25 per cent sales gain over the fourth quarter of last year," says one producer. "Our third quarter sales could be as good as last year's third quarter despite the strike."

Popularity Poll—It is estimated that electric furnace installations will jump some 15 million tons by 1970 (STEEL, Apr. 9, p. 120). Observers in industry say that electric furnaces will gain popularity as:

1. Cheaper electric power becomes available.

2. Week-end overtime payments to steel labor and higher over-all operating costs bring the dollar outlay for running an open hearth to the same point as the cost of producing carbon steel in electrics.

3. Added savings are brought about as steel plants design facilities for exclusive use of electrics.

Versatility—Electrics are used to some degree in the production of practically all ferrous and nonferrous metals. Depending on the size and efficiency of the operation, electric steelmaking consumes anywhere from 8 to 16 lb of furnace electrodes for each ton of steel, says F. B. O'Mara, manager of electrode products for National Carbon Co., New York.

About 35 per cent of all alloy steel is made in electric furnaces. Some carbon steel also is produced in this manner, although tonnages are small at present. But some spokesmen in industry say that by 1970, as much as 14 per cent, or about 26 million tons, of total steel capacity will be produced in electrics. Manufacturers of electric furnaces and electrodes have set a goal of 30 per cent of all carbon steel for electrics, but they admit that will be in the far future. However, the growth factor spells new business for both industries.

Almost Twins—There are two kinds of furnace electrodes—carbon and graphite. Both perform basically the same job, but the long range trend has been to the graphites because of their slightly better physical and thermal characteristics. They must be resistant to mechanical breakage and must be able to withstand temperatures above 6000°F.

Carbon electrodes are used primarily in the making of ferroalloys, phosphorus and, to a lesser degree, steel ingots and castings. Graphite electrodes are gaining wide acceptance for use in low carbon steel and alloy steels.

Production—Carbon electrodes are made from anthracite coal. Graphite electrodes have a petroleum coke base. Both types are sized, milled, mixed with coal tar pitch, extruded and baked. After being baked in a gas-fired furnace (1832°F) the carbon electrode is ready for shipment. The graphite electrodes are baked, then reheated in graphitizing furnaces up to about 5432°F.

Larger electrodes are coming. Sample of sizes today—carbon electrodes can be 9 ft long and 53 in. in diameter. Graphite electrodes measure up to 9.2 ft long and 45 in. in diameter. As furnaces get bigger, so will the electrodes.

New Pricing System

Russell, Burdsall & Ward adopts quantity brackets and discounts for marketing bolts

A NEW pricing system for bolts is being initiated by Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. With the establishment of quantity brackets and graduated discounts, the new structure is patterned after steel mill marketing practices, says Harry O. McCully, vice president in charge of sales. RB&W is also adopting a 2 per cent cash discount, double the previous allowance.

Price changes, according to Mr. McCully, vary according to type and size of fastener and quantity ordered. "In one product grouping, prices are reduced 5.4 per cent. The other extreme represents a 31 per cent increase—in this case covering slow-moving sizes ordered in small quantities."

Brackets — The new cash discount was adopted despite the fact that "we still can earn only 0.5 per cent on our money in discounting our material invoices," the company says. Quantity brackets under the new system are: 40,000 lb shipments; 20,000 lb shipments; 30 container shipments; full container quantities and less than full container lots.

Other bolt manufacturers contacted by STEEL indicate they intend to study this move by RB&W. If they see merit in the system for their products and markets, they will consider adopting it.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 130

Progressive Mfg. Co., Division of Torrington Co., Torrington, Conn., has added Phillips head screws to its line of fasteners. Last month the firm began production of slotted tapping screws. Phillips head screws will be made to order.

Canadian Steel Prices Rise

Canadian steel prices have advanced $6 to $8 a ton. Algoma Steel Corp. announced these changes, f.o.b. Sault Ste. Marie, Ont.: Sheet piling, up $8; structural shapes, up $7; cold-rolled sheets and strip, up $6; and most other major items, up $7.

Steel Co. of Canada Ltd. changed its basing point from Toronto to Hamilton, Ont., with these items showing advances of $6 a ton (quotations are per 100 lb): Merchant bars, $5.15; plate, $5.15; hot-rolled sheet, $4.80; cold-rolled sheet, $6.05; and galvanized sheet, $6.35.

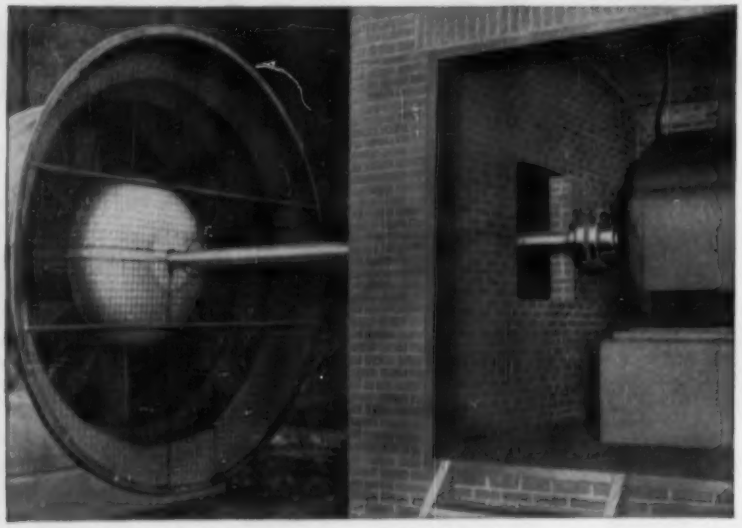
Sheets, Strip . . .

Sheet & Strip Prices, Pages 128 & 129

Little fourth quarter tonnage is being accepted for delivery before the middle of November. Producers will book their capacity for the rest of the year, yet they probably will not be able to meet the rapidly developing demand. Fourth quarter allocations will about match the second quarter's.

The bulk of carry-overs should be shipped by the end of October. It's too early to judge the auto

Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16' from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it, which have been giving dependable service for as long as fifteen years . . . without shutdowns for lubrication or maintenance of the couplings.

Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

Only Thomas Flexible Couplings offer *all* these advantages

UNDER LOAD and MISALIGNMENT

1. Freedom from Backlash—Torsional Rigidity
2. Free End Float
3. Smooth Continuous Drive with Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life

. . . *and*

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THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.

maker's participation in the last quarter's sheet sales, although stronger demand is seen in November and December.

Seasonally active at this time are fabricators of fuel oil tanks. Cold strip converters seem to have substantial stocks of hot-rolled coils for conversion and slitting.

Silicon grades will be tight in New England. Carry-overs are heavy, and the return to normal production is slow.

Steel Bars . . .

Bar Prices, Page 127

Despite reduced consumption by farm implement makers, hot-rolled carbon bars are tight in Chicago. New York customers are feeling the pinch, too: A fastener maker who thought he had a good inventory at the strike's beginning, now says some shortages have already developed, especially in the higher carbon grades and in the larger sizes.

Producers of cold-finished bars are in doubt about their supply of hot-rolled steel: Mills won't hit their normal operations until this week. Delayed orders complicate the fourth-quarter picture, although mills are taking new orders.

Philadelphia has experienced a mild flurry in buying for automotive requirements (including forge shops), but the buying is not going beyond the initial needs for 1957 model change-overs.

New England inventories of stainless, forging and leaded alloy bars have not been reduced as much as expected.

Plates . . .

Plate Prices, Page 127

Plate will be tight well into 1957. More fabricators are curtailing production as they wait for tonnage to start coming from the mills. One large producer is unable to accept any new tonnage of alloy plate for delivery this year.

New York consumers are strictly on a hand to mouth basis. Accentuating the situation: Government rated orders must be worked off first; some producers are directing some of their tonnage to their own expansion programs.

Increasing demand for sheet in

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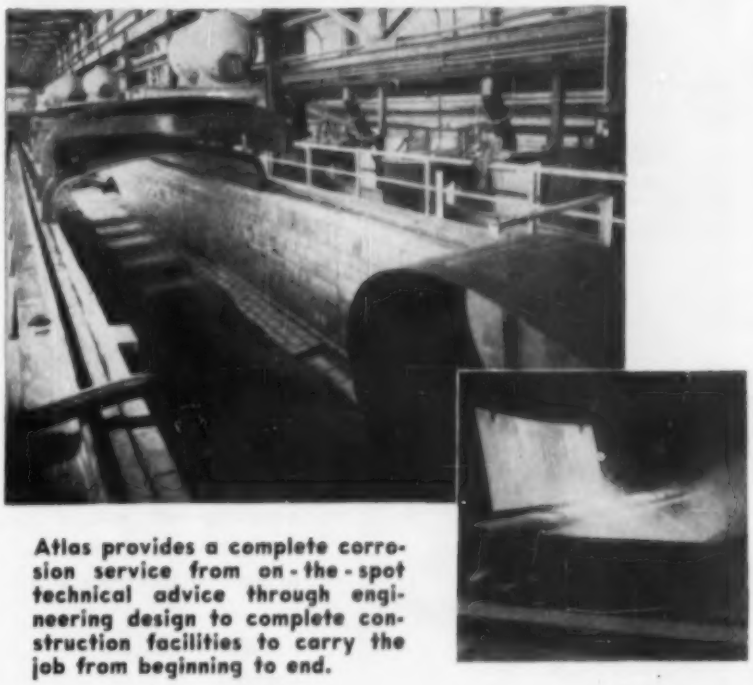

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the Pittsburgh area makes it impossible for mills there to roll light plate on sheet mills or to switch ingots from sheet to plate mills. The need for plate is strongest in the larger gages.

Eastern mills, which operated during the strike, have heavy backlogs running into December. Boston weldment shops are losing ground against delivery schedules because of the plate shortage.

Tin Plate . . .

Tin Plate Prices, Page 129

Tin plate producers expect to meet requirements of canners this year, despite production losses in July and August. One major producer in the Pittsburgh area continued to operate during the strike, and others are bringing their production up to full capacity.

Need for tin plate is not too critical, despite heavy need for the product which will follow the fall harvest. Consumers placed their orders early this year and built up their stocks before the strike began. Mills cleaned out their inventories in late June. With shipments heavy now, mills will have difficulty building their own warehouse supplies up to normal in the fourth quarter. Users normally like to have mills carry sizable stocks of tin plate in "off seasons" for their emergency use.

Tubular Goods . . .

Tubular Goods Prices, Page 131

The Suez Canal crisis has focused attention on the need to build up facilities for pipe. Demand for oil country tubing continues to outstrip supply, especially in high alloy products. At least two firms plan to increase their capacity for oil country products, and a third may follow. Besides Jones & Laughlin Steel Corp.'s proposed construction at Houston, National Tube Division, U. S. Steel Corp., has announced plans to expand operations at McKeesport, Pa., and Lorain, O.

Demand for small pipe (10 in. in diameter) in San Francisco is so strong that delivery time has been extended to December. Cast iron pipe buyers are again in the Seattle market. Bids are in at Portland, Oreg., for 726 tons. Pullman, Wash., awarded a carload on the

basis of 14-day delivery; a competing firm offered the same price, but delivery in 8 to 10 weeks.

Warehouse . . .

Warehouse Prices, Page 121

Seattle warehouses report purchasers are reconciled to higher prices. The remainder of the year looks promising, with sales at a high level. Los Angeles stocks are in fair shape, with the major exception of structural steel.

Volume is down for Philadelphia jobbers: Depleted inventories of plates and structurals have contributed to the situation. Stocks of cold-rolled and galvanized sheets and cold-finished bars are good, but somewhat lower in hot-rolled sheets and bars.

One Pittsburgh warehouse manager reports mills are refusing to take orders for October on sheet, plate and structural steel. Those products, as well as some sizes of bars, have tightened considerably in the last month.

Increased interest of auto makers in sheet during the fourth quarter will limit supplies to the warehouses.

Structural Shapes . . .

Structural Shape Prices, Page 127

New York structural demand features office building construction: Union Carbide & Carbon Co. has placed 29,000 tons for an office building at 270 Park Ave.; American Bridge Division, U. S. Steel Corp., and Chase-Manhattan Bank closed new bids on an office development in lower Manhattan, which will require about 50,000 tons. There are at least two projects of 4000 tons each in bridge work. Bids will be opened Sept. 13 on several sizable jobs in New York state, including a $6-million expressway section in Kings county.

Certain shape makers are out of the market until December, having committed themselves well into the third quarter at the time of the strike.

Some Philadelphia structural fabricating shapes are almost down because of the lack of material. While more bridge designs call for prestressed concrete and buildings for reinforced concrete,

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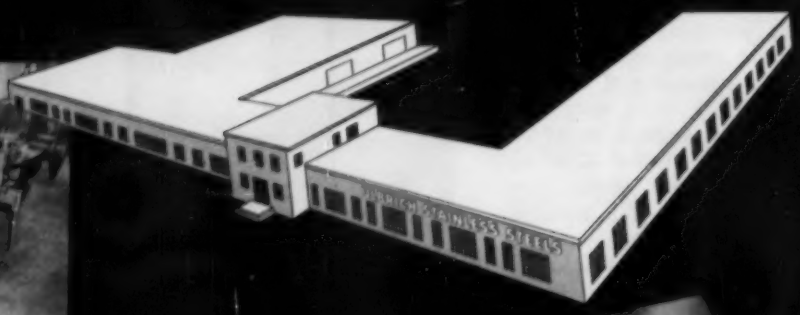

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the supply of structurals won't improve before the first quarter of 1957.

Some foreign steel piling is coming into the country for midwestern projects, as the piling shortage becomes even more critical.

West coast fabricators report scarce items tighter than ever, with inquiries for shapes continuing to be strong.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

29,000 tons, office building, Union Carbide & Carbon Co., 270 Park Ave., New York, to American Bridge Division, United States Steel Corp., Pittsburgh.

4755 tons, elevated highway structure, Kneeland-Dover street spur, Central Artery, Boston, to West End Iron Works, Cambridge, Mass., through Berke-Moore Co., Boston, general contractor.

970 tons, seven grade separation structures, Connecticut Turnpike project 330-01, Plainfield-Killingly, to Phoenix Bridge Co., Phoenixville, Pa.; Brunalli Construction Co., Southington, Conn., and M. A. Gammino Construction Co., Providence, R. I., joint general contractors.

870 tons, state bridge work, contract 86-4, Westchester county, New York, through Mt. Vernon Contracting Co., to Karl Koch Erecting Co. Inc., with fabricator unnamed.

850 tons, boiler supports, Josephtown, Pa., for Combustion Engineering Inc., to Cantley Fabricators, Philadelphia.

400 tons, structurals and bars, teaching hospital, J. Hillis Miller Health Center, University of Florida, Gainesville, Fla.; structurals to Tampa Forge & Iron Co., Tampa, and bars to General Fireproof Co., Atlanta, through Arnold Construction Co., Palm Beach, Fla., general contractor.

210 tons, three state bridges and toll facilities, Rochester, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

175 tons, state highway bridge, Ashford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Della-Bitta-Basola Inc., Southington, Conn., general contractor.

160 tons, schools at Edmonds and Bellevue, Wash., to Lockenby Structural Steel Co., Seattle.

155 tons, coal handling facilities, Fairbanks, Alaska, and school at Tonasket, Wash., to Lockenby Structural Steel Co., Seattle.

140 tons, office building and garage, Liberty National Bank & Trust Co. to Robberson Steel Co., through Harmon Construction, general contractor, all of Oklahoma City, Okla.

110 tons, single span welded composite bridge, Southbury, Conn., to Phoenix Bridge Co., Phoenixville, Pa.; W. J. Megin Inc., Naugatuck, Conn., general contractor.

110 tons, three-span composite beam bridge, Washington, Conn., to McDermott Steel Specialties Co., New Haven; Oneglia & Gervasini Inc., Torrington, Conn., general contractor.

100 tons, state bridge, Route 206, section 2-13, Burlington county, New Jersey, through Bilia Contracting Co., to Elizabeth Iron Works, Elizabeth, N. J.

STRUCTURAL STEEL PENDING

50,000 tons, office building, Chase-Manhattan Bank, lower Manhattan, New York; new bids closed last week.

5000 tons, municipal court house, New York; bids postponed until Sept. 12.

4400 tons, lift span bridge over the Arthur Kill, Staten Island; bids closed by the Staten Island Rapid Transit Railway Co., Aug. 30.

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Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

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4275 tons, state bridge over Manahawkin Bay, Ocean county, New Jersey; Conduit & Foundation Corp., Philadelphia, low on general contract; 700 tons of reinforcing steel also required.

330 tons, Oregon state college, Portland; bids in.

260 tons, including 130 tons wide flange, general supply stores, Navy, Philadelphia, Aug. 27-29.

250 tons, tunnel supports, right diversion tunnel, Glen Canyon dam, bids to Bureau of Reclamation, Kanab, Utah, Sept. 11.

240 tons, rolled beam bridge, over railroad, Putnam, Conn.; included 155 tons steel piles.

175 tons, section A, Malden tunnel, Spot Pond flood control project, Malden, Mass.; also 165 tons, reinforcing bars, and 60 tons, steel piling.

170 tons, two-span rolled beam bridge, Shepaug river, Roxbury, Conn.; included 80 tons, steel piles.

167 tons, also 90 tons reinforcing, Washington state undercrossing, Olympia, Wash.; general award to MacRae Bros., Seattle.

165 tons, also 35 tons reinforcing, Salmon river bridge, Idaho; bids to Forest Service, McCall, Idaho, Aug. 28.

100 tons, also 50 tons reinforcing, Washington state highway bridge, Adams county; general contract to C. E. Oneal, Ellensburg, Wash.

100 tons, state highway bridge, Warren, Vt.; bids Aug. 31, Montpelier.

REINFORCING BARS . . .

REINFORCING BARS PLACED

30,000 tons, Priest Rapids Columbia river power project, to Gilmore & Skobe Co., Oakland, Calif; general contract to Merritt, Chapman & Scott, New York.

795 tons, Southwest Seattle high school, to Bethlehem Pacific Coast Steel Corp., Seattle; H. S. Wright & Co. Inc., Seattle, general contractor.

375 tons, three state bridges and toll facilities, Rochester, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

314 tons, Washington state highway project, Thurston county to Bethlehem Pacific Coast Steel Corp., Seattle; MacRae Bros., Seattle, general contractors.

280 tons, Boeing Air field project, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

161 tons, remodeling Olympia Hotel, Seattle, Tacan project, Kenai, Alaska and Navy project, Ault field, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

780 tons, also 5600 ft steel sheet piling, Broad street underpass, Seattle; bids Sept. 5.

187 tons, Washington state project, three I-beam bridges, King county; bids to Olympia Aug. 28.

100 tons, plus 70 tons shapes, Benton county Yakima river bridge; bids to Prosser, Wash., Sept. 6.

100 tons, Washington state highway projects Spokane, Clallam and Mason countries; bids in.

PIPE . . .

CAST IRON PIPE PLACED

170 tons, system expansion, Kelso, Wash., to U. S. Pipe & Foundry Co., Seattle.

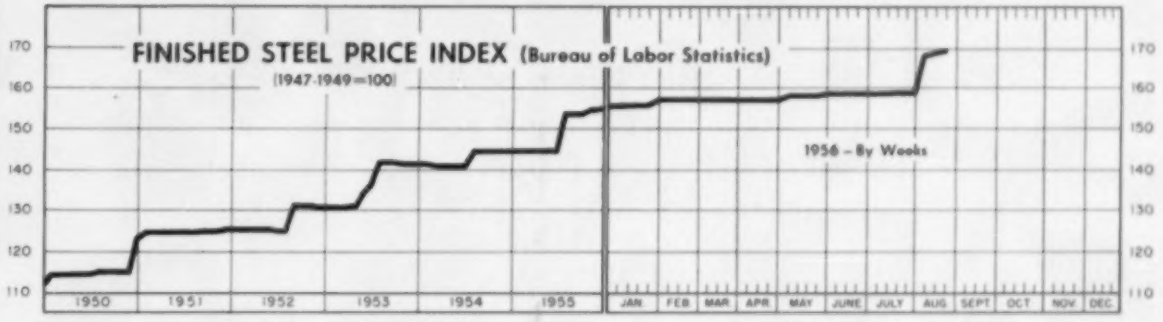
CAST IRON PIPE PENDING

720 tons, various sizes; bids in to Portland, Oreg. Aug. 17.

300 tons or more, 65,000 ft 4, 6 and 8 in., also accessories; alternatives invited; bids to District No. 81, Kirkland, Wash., Sept. 4; bids for tanks and pumping equipment later.

112 tons, 9000 ft, 4 and 6 in.; bids to King county, District No. 90, Renton, Wash., Aug. 21.

Price Indexes and Composites



Aug. 21, 1956	Week Ago	Month Ago	Aug. Avg.	Year Ago
168.6	168.6	158.6	168.6	153.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150
Rails, Light, 40 lb	6.567
Tie Plates	6.025
Axles, Railway	8.950
Wheels, Freight Car, 33 in. (per wheel)	57.50
Plates, Carbon	5.550
Structural Shapes	5.267
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.760
Bars, H.R., Alloy	10.033
Bars, H.R., Stainless, 303 (lb)	0.483
Bars, H.R., Carbon	5.925
Bars, Reinforcing	5.738
Bars, C.F., Carbon	9.610
Bars, C.F., Alloy	13.275
Bars, C.F., Stainless, 302 (lb)	0.566
Sheets, H.R., Carbon	5.695
Sheets, C.R., Carbon	6.639
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.635
Sheets, Electrical	11.225
Strip, C.R., Carbon	8.843
Strip, C.R., Stainless, 403 (lb)	0.475
Strip, H.R., Carbon	5.900
Pipe, Black, Buttweld (100 ft)	18.378
Pipe, Galv., Buttweld (100 ft)	22.516
Pipe Line (100 ft)	182.860
Casing, Oil Well, Carbon (100 ft)	178.046
Casing, Oil Well, Alloy (100 ft)	276.370
Tubes, Boiler (100 ft)	*45.033*
Tubing, Mechanical, Carbon (100 ft)	*22.973*
Tubing, Mechanical, Stainless, 304 (100 ft)	*187.133*
Tin Plate, Hot-dipped, 1.25 lb	9.333
Tin Plate, Electrolytic, 0.25 lb	8.033
Black Plate, Canmaking Quality	7.133
Wire, Drawn, Carbon	9.175
Wire, Drawn, Stainless, 430 (lb)	0.630
Bale ties (bundle)	7.213
Nails, Wire, 8d Common	9.368
Wire, Barbed (80-rod spool)	8.412
Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 22 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.71	225.71	210.45	207.63	171.92
Index in cents per lb	6.114	6.114	5.701	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.59	$137.59	$131.27	$127.41	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	61.09	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	60.11	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	61.63	59.77	53.27
Steelmaking Scrap, GT	56.17	56.67	47.50	44.33	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 22 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.675	5.675	4.65	4.65	3.70
Bars, H.R., Chicago	5.675	5.675	4.65	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.20
Bars, C.F., Pittsburgh	6.85*	6.85*	6.25*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	4.60	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	4.60	4.60	3.65
Shapes, deld. Philadelphia	5.00	5.00	5.00	4.85	3.91
Plates, Pittsburgh	4.85	4.85	4.50	4.50	3.70
Plates, Chicago	4.85	4.85	4.50	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	4.80	4.50	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.50	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.325	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.325	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.325	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.325	5.325	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.325-5.425	4.56
Sheets, Galv., Pittsburgh	6.30	6.30	5.85	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.325	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.325	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.25	6.317	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.25-6.35	6.35-6.45	4.90
Strip, C.R., Detroit	6.35-6.95	6.35-6.95	6.25	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	6.60	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.35	8.35	7.60	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$9.55	$9.55	$9.55	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets forging, Pitts. (NT)	$91.50	$91.50	$84.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.375	5.025	4.10-4.20

PIG IRON, Gross Ton	Aug. 22 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$62.26	$59.50	$53.00
Basic, Valley	62.50	62.50	60.00	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	59.16	56.49
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	59.66	59.66
No. 2 Fdry, Birm.	59.00	59.00	57.00	55.00	48.55
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	62.70	62.70	55.33
Malleable, Valley	63.00	63.00	60.50	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	212.00†	196.00†	158.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$57.50	$54.00	$46.50	$44.50	$45.00
No. 1 Heavy Melt, E. Pa.	58.00	57.00	50.00	46.50	43.50
No. 1 Heavy Melt, Chicago	59.00	59.00	46.00	42.00	43.50
No. 1 Heavy Melt, Valley	64.50	64.50	49.50	46.50	45.00
No. 1 Heavy Melt, Cleve.	62.00	62.00	45.50	44.00	44.00
No. 1 Heavy Melt, Buffalo	56.50	54.50	44.50	39.50	44.00
Rails, Rerolling, Chicago	83.50	80.50	68.50	64.50	52.50
No. 1 Cast Chicago	53.50	53.50	45.50	46.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.125	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	16.50	16.50	17.50

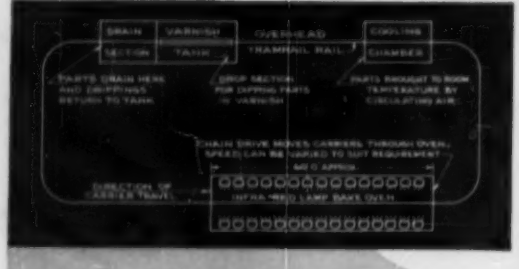
Armatures are dipped into varnish by use of a tramrail drop section which later is raised permitting carrier to travel forward.

After draining, armatures are advanced to oven. Carriers are traveled slowly through oven by motor-driven chain drive.

DIP-BAKE-DRY

It's FAST, CLEAN and EASY with this Simple Overhead System

In cooling chamber armatures are cooled to room temperature.


DRAIN SECTION
VARNISH TANK
OVERHEAD TRAMRAIL
COOLING CHAMBER
PARTS DRAIN HERE AND DRIPPINGS RETURN TO TANK
DROP SECTION FOR DIPPING PARTS IN VARNISH
PARTS BROUGHT TO ROOM TEMPERATURE BY CIRCULATING AIR
CHAIN DRIVE MOVES CARRIERS THROUGH OVEN. SPEED CAN BE VARIED TO SUIT REQUIREMENT
INFRA-RED LAMP BAKE OVEN

Many man-hours are saved by a simple, efficient and inexpensive overhead loop Cleveland Tramrail system in the Varnish Insulation Department of the Arrowhead Plant of D. W. Onan & Sons, Minneapolis, large manufacturer of electrical generating plants.

Armature and other parts are dipped in varnish, drained, baked and air cooled without manual handling. Only when they are hung onto or taken off the tramrail carriers need they be handled. Every trip around the loop completes a varnish application.

The system makes the work fast and easy. More parts are treated at lower unit cost. Both workers and room are kept clean and free of sticky varnish.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7813 East 284th St. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 128; to footnotes, page 130.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$69.00
Houston 85 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 .....74.00
Bridgeport,Conn. N19..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ...83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2..74.00
LoneStar,Tex. L6 .....74.50
Munhall,Pa. U5 .....74.00
Pittsburgh J5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ...74.00
Youngstown R2 .....74.00

Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 .....91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston 85 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Pittsburgh J5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ...91.50
S.SanFrancisco B3 ..101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston 85 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 107.00
S.Duquesne,Pa. U5 ...107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14 111.50
S. Duquesne,Pa. U5 ..111.50

SHELP

Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.625
SparrowsPoint,Md. B2 .4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston 85 .....6.05
IndianaHarbor,Ind. Y1 .5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 .....5.80
N.Tonawanda,N.Y. B11.5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.725
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ....6.25
Sterling,Ill. N15 .....6.35
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.30
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston 85 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14 .5.00
S.SanFrancisco B3 ....5.65
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 .....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.85
IndianaHarbor,Ind. I-2..5.00
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Clairton,Pa. U5 .....6.20
Fontana,Calif. K1 .....7.85
Gary,Ind. U5 .....6.20
Houston 85 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.05
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston 85 .....7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 .....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Ind.Harbor,Ind. I-2 ....7.35
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2....4.65
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.90
Lackawanna,N.Y. B2 ...5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky. (15) A10...4.85
Bessemer,Ala. T2 .....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 .....4.85
Claymont, Del. C22 ....5.35
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.90
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 .5.55
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 .....5.80
Houston 85 .....4.95
Ind.Harbor,Ind. I-2, Y1..4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....4.85
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. N9 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 ..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Weirton,W.Va. W6 .....4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....6.20
Fontana,Calif. K1 .....6.70
Geneva,Utah C11 .....6.00
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 .....11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 .7.95
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston 85 .....7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 .....7.25

PLATES, Alloy

Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.55
Gary,Ind. U5 .....6.85
Houston 85 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. N9 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14 .6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2....5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10 5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa. U5 .....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.40
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva(9) C11 .....5.175
Houston(9) 85 .....5.325
Ind.Harbor(9) I-2, Y1 ..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill P22 .....5.575
KansasCity,Mo.(9) S5 ..5.325
Lackawanna(9) B2 .....5.075
LosAngeles(9) B3 .....5.775
Midland,Pa.(9) C18 .....4.65
Milton,Pa.(25) M18 ...5.425
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 .....5.85
N.Tonawanda,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11..5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'c'go(9) R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 .5.85
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11..5.775
Weirton,W.Va.(9)W6 ...5.075
Youngstown(9) R2, U5..5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....5.575
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.125
Houston 85 .....6.375
Ind.Harbor,Ind. I-2, Y1 6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.S. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.40
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston 85 .....7.675
Ind.Harbor,.Ind. Y1 ..7.425
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 .....7.675
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago U5, W14 .....7.425
S.Duquesne,Pa. U5 .....7.425
S.SanFrancisco B3 .....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES, H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Lackawanna(9) B2 ....5.075

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Fontana,Calif. K1 .....5.35
Joliet,Ill. P22 .....5.10
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.45
KansasCity,Mo. S5 .....6.45
Youngstown U5 .....6.20

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....9.225
Newark,N.J. W18 .....8.50
SpringCity,Pa. K3 .....8.50
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2.6.85
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.25
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.25
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPrk.Ill. N8 ....6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13..6.85
Hartford,Conn. R2 ....7.30
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....7.70
LosAngeles R2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ...6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(8) C19.8.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R28.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....8.325
Cleveland A7, C20 .....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....7.425
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N8 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13.8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 .....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.525
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 .....5.80

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .5.075
Houston B5 .5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 .5.075
Joliet,Ill. P22 .5.575
KansasCity,Mo. S6 .5.325
Lackawanna,N.Y. B2 .5.075
LosAngeles B3 .5.775
Milton,Pa. M18 .5.225
Minnequa,Colo. C10 .5.525
Niles,Calif. P1 .5.85
Pittsburg,Calif. C11 .5.775
Pittsburgh J5 .5.075
Portland,Oreg. G4 .5.85
SandSprings,Okla. S5 .5.575
Seattle B3 N14 .5.825
S.Chicago R2 .5.075
S.Duquesne,Pa. U5 .5.075
S.SanFrancisco B3 .5.825
SparrowsPoint,Md. B2 5.075
Sterling,Ill.(1) N15 .5.075
Sterling,Ill. N15 .5.175
Struthers,O. Y1 .5.075
Torrance,Calif. C11 .5.775
Youngstown R2, U5 .5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U5 .6.31
Cleveland U5 .6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Kans. S5 .6.825
Lackawanna,N.Y. B2 .6.17
Marion,O. P11 .6.15
New York U5 .7.12
Pittsburgh U5 .6.75
Seattle B3, N14 .7.20
SparrowsPt. ⅝-1" B2 .6.73
Williamsport,Pa. S10 .6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 .5.075
ChicagoHts.(4) C2 .5.65
Ft.Worth,Tex.(28) T4 .5.525
Franklin,Pa.(4) F5 .5.40
Franklin,Pa.(1) F5 .5.10
JerseyShore,Pa.(4) J5 .5.00
Marion,O.(5) P11 .4.65
Moline,Ill.(3) R2 .5.225
Tonawanda (3) B12 .5.65
Tonawanda (4) B12 .6.15
Williamsport,Pa.(3) S10 5.65

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.670
McK.Rks.(S.R.) L5 ...12.305
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....6.675
Allenport,Pa. P7 .....6.675
Ashland,Ky.(8) A10 ..6.675
Cleveland J5, R2 ....6.675
Conshohocken,Pa. A3 .6.725
Detroit(8) M1 .....6.775
Dravosburg,Pa. U5 ....6.675
Ecorse,Mich. G5 .....6.775
Fairfield,Ala. T2 .....6.675
Fairless,Pa. U5 .....6.725
Fontana,Calif. K1 ....6.475
Gary,Ind. U5 .....6.675
Geneva,Utah C11 .....6.775
GraniteCity,Ill.(8) G4 .6.875
IndiHarbor, Ind. I-2, Y1 6.675
Lackawanna,N.Y. B2 ..6.675
Munhall,Pa. U5 .....6.675
Newport,Ky.(8) N9 ..6.675
Niles,O. M21 .....6.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....6.675
Portsmouth,O. P12 ....6.725
Riverdale,Ill. A1 .....6.675
Sharon,Pa. S3 .....6.675
S.Chicago,Ill. W14 ....6.675
SparrowsPoint,Md. B2. .6.675
Steubenville,O. W10 ..6.675
Warren,O. R2 .....6.675
Weirton,W.Va. W6 .....6.675
Youngstown U5, Y1 ..6.675

SHEETS, H.R., (19 ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ...7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 .....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 ....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ..6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ....4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Dravosburg,Pa. U5 ....5.75
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ..6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.925
SparrowsPoint,Md. B2 5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ..8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 .8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 8.525
Warren,O. R2 .....8.625
Weirton,W.Va. W6 ....8.525
Youngstown Y1.....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 .....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ...6.90
MartinsFry.O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50‡
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ..9.275
SparrowsPoint(39) B2 9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)8.95
Butler,Pa. A10 (type 2)9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ...6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ...6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.175
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div. Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 NationalTube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T12 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(5) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	*4.675*
SanFrancisco S7	5.05
Seattle(25) B3	5.675
Seattle N14	5.40
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.80
Carnegie,Pa. S18	*7.75*
Dravosburg U5	7.75
Fontana,Calif. K1	9.65
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Fontana,Calif. K1	8.025
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(5) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	*6.85*
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D2	6.95
Detroit P20	6.35
Detroit D2, M1	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F6	*6.85*
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	*7.00*
Lackawanna,N.Y. B2	6.35
LosAngeles C1	8.90
NewBedford,Mass. R16	7.30
NewBritain(16) S15	6.85
NewCastle,Pa. B4, E5	*6.85*
NewHaven,Conn. A7, D2	7.30
NewKensington,Pa. A6	*6.85*
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y. (32) R6	6.85
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	8.40
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	*14.55*
Cleveland A7	*14.55*
Dover,O. G6	*14.55*
Franklin Park,Ill. T6	13.45
Harrison,N.J. C18	*14.55*
Indianapolis C8	*14.70*
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	14.55
Worcester,Mass. A7	*14.85*
Youngstown C8	*14.55*

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	*10.10*
Dover,O. G6	*10.10*
Ecorse,Mich. G5	*10.10*

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	*9.80*	*12.60*	*15.00*	...
Cleveland A7	7.70	9.80	12.60	15.00	17.95
Cleveland C7	...	*9.80*	*12.60*	*15.00*	*17.95*
Dover,O. G6	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
Detroit D2	7.20	9.15	10.70	12.85	...
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	*12.90*	*15.30*	*18.25*
Indianapolis C8	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
NewBritain,Conn. (10) S15	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
NewCastle,Pa. B4, E5	*7.95*	*9.80*	*12.60*	*15.00*	...
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	...
NewKensington,Pa. A6	7.10	9.05	10.60	...	...
New York W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	*8.05*	*9.85*	*12.60*	*15.00*	*17.95*
Rome,N.Y. (32) R6	7.95	9.80	12.60	15.00	17.90
Trenton,N.J. R5	...	*10.10*	*12.90*	*15.30*	*18.25*
Wallingford,Conn. W2	7.85	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
Worcester,Mass. A7, T6	8.25	10.10	12.90	15.30	18.25
Youngstown C8	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*

Spring Steel (Tempered)			Up to 0.80c	0.81-1.05c	1.06-1.35c
Bristol,Conn. W1	...	...	16.80	20.65	...
Buffalo W12	...	...	*16.80*	...	...
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	*16.80*	*20.65*	*25.00*
NewYork W3	...	...	16.80	20.65	25.00
Palmer,Mass W12	...	...	*16.80*	...	...
Trenton,N.J. R5	...	...	*16.80*	*20.65*	*25.00*
Worcester,Mass. W12	...	...	14.80	...	...
Worcester,Mass. A7, T6	...	...	16.80	20.65	25.00
Youngstown C8	...	...	*17.50*	*21.00*	*25.35*

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	*9.20*	*10.35*	*11.00*	*12.05*	...
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	...
Zanesville,O. A10	...	10.35	11.00	12.05	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	...
IndianaHarbor,Ind. I-2, Y1	9.20†	10.35*	11.025*	12.075*	...
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	...	10.85†	11.525†	12.575† 13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	T-73	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	...	...	...
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	15.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	15.50	19.00	19.50	....
Vandergrift,Pa. U5	..	15.90	16.90	15.50	19.00	19.50 14.55**
Warren,O. R2	....	....	....	....	....	.... 14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¼-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.20	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	*7.20*
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	*7.30*
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	*7.55*
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	*7.30*
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda B11	7.20
Palmer,Mass. W12	*7.50*
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.10
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester, Mass. A7	7.50

WIRE, MS Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	*8.725*
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth,Minn. A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Millbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	*9.025*
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.60
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester,Mass. A7	9.025

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	*8.40*
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth,Minn. A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	*8.70*
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.30
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	12.65
Buffalo W12	*14.15*
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	*14.25*
Fostoria,O. S1	*14.15*
Jacksonville,Fla. M8	*14.50*
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	*14.15*
Minnequa,Colo. C10	*13.90*
Monessen,Pa. P6	*14.15*
Muncie,Ind. I-7	12.75
Palmer,Mass W12	*14.45*
Roebling,N.J. C10	*14.45*
S.SanFrancisco C10	*14.50*
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	*11.75*
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	*11.875*
Monessen,Pa. P16	*11.75*
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	*12.05*
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.50
Roebling,N.J. R5	*12.05*
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	*11.75*

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	*11.55*
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	*11.85*
Portsmouth,O. P16	11.35
Roebling,N.J. R5	*11.85*
SparrowsPt. B2	*11.65*
Struthers,O. Y1	11.35
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	*14.45*
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	*10.75*
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	*10.75*
Cleveland A7	10.75
Crawfordsville,Ind. M8	*10.75*
Dover,O. G6	*10.75*
Fostoria,O. 51	*10.75*
FranklinPark,Ill. T6	9.80
Kokomo,Ind. C16	*10.75*
Massillon,O. R3	*10.75*
Milwaukee C23	10.90
Monessen,Pa. P7, P16	*10.75*
Palmer,Mass. W12	*11.05*
Pawtucket,R.I. N8	9.80
Riverdale,Ill. A1	*10.85*
Rome,N.Y. R6	10.75
Trenton,N.J. R5	*11.05*
Worcester, A7, T6	11.95

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R3	167
Aliquippa,Pa. J5	167
Atlanta A11	169
Bartonville,Ill. K4	169
Chicago,Ill. W13	167
Cleveland A9	173
Crawfordsville,Ind. M8	*169*
Donora,Pa. A7	167
Duluth,Minn. A7	167
Fairfield,Ala. T2	167
Houston,Tex. S5	172
Jack'ville,Fla.(20) M8	*178*
Johnstown,Pa. B2	169
Joliet,Ill. A7	167
KansasCity,Mo. S5	172
Kokomo,Ind. C16	169
Minnequa,Colo. C10	172
Monessen,Pa. P7	167
Pittsburg,Calif. C11	186
Rankin,Pa. A7	167
S.Chicago,Ill. R2	167
SparrowsPt.,Md. B2	169
Sterling,Ill.(1) N15	167
Worcester,Mass. A7	173

(To Wholesalers; per cwt)

Galveston,Tex. D7	8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	167
Aliquippa,Pa. J5	167
Atlanta A11	169
Bartonville,Ill. K4	169
Crawfordsville,Ind. M8	*169*
Donora,Pa. A7	167
Duluth,Minn. A7	167
Fairfield,Ala. T2	167
Jack'villeFla.(20) M8	*178*
Johnstown,Pa. B2	169
Joliet,Ill. A7	167
Kokomo,Ind. C16	169
Minnequa,Colo. C10	172
Monessen,Pa. P7	167
Pittsburg,Calif. C11	186
Rankin,Pa. A7	167
S.Chicago,Ill. R2	167
SparrowsPt.,Md. B2	169
Sterling,Ill.(1) N15	167
Worcester,Mass. A7	173

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	*$10.01*
Bartonville,Ill. K4	10.15
Buffalo W12	*10.05*
Crawfordsville,Ind. M8	*10.17*
Donora,Pa. A7	10.03
Duluth,Minn. A7	10.03
Jacksonville,Fla. M8	*10.58*
Johnstown,Pa. B2	10.03
Joliet,Ill. A7	10.03
Kokomo,Ind. C16	*10.17*
LosAngeles B3	*10.52*
Minnequa,Colo. C10	10.28
Pittsburg,Calif. C11	10.81
S.Chicago,Ill. R2	*10.01*
SparrowsPt.,Md. B2	10.13
Sterling,Ill. N15	10.03

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	*$10.35*
Bartonville,Ill. K4	10.45
Buffalo W12	*10.35*
Crawfordsville,Ind. M8	*10.45*
Donora,Pa. A7	10.35
Duluth,Minn. A7	10.35
Jacksonville,Fla. M8	*10.91*
Johnstown,Pa. B2	10.35
Joliet,Ill. A7	10.35
Kokomo,Ind. C16	*10.45*
LosAngeles B3	*11.15*
Minnequa,Colo. C10	10.60
Pittsburg,Calif. C11	11.15
S.Chicago,Ill. R2	*10.35*
SparrowsPt.,Md. B2	10.45
Sterling,Ill. N15	10.35

Coil Interim	
AlabamaCity,Ala. R2	*$10.40*
Bartonville,Ill. K4	10.50
Buffalo W12	*10.40*
Crawfordsville,Ind. M8	*10.50*
Donora,Pa. A7	10.40
Duluth,Minn. A7	10.40
Jacksonville,Fla. M8	*10.96*
Johnstown,Pa. B2	10.40
Joliet,Ill. A7	10.40
Kokomo,Ind. C16	*10.50*
LosAngeles B3	*11.34*
Minnequa,Colo. C10	10.65
Pitts.,Calif. C11	11.20
S.Chicago,Ill. R2	*10.40*
SparrowsPt.,Md. B2	10.50
Sterling,Ill. N15	10.40

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.187**
Aliquippa,Pa. J5	.184§
Atlanta A11	.193
Bartonville,Ill. K4	.193
Crawfordsville,Ind. M8	*.193*
Donora,Pa. A7	.187†
Duluth,Minn. A7	.187†
Fairfield,Ala. T2	.187†
Houston,Tex. S5	.192**
Jacksonville, Fla. M8	*.198*
Johnstown,Pa. B2	.191*
Joliet,Ill. A7	.187†
KansasCity,Mo. S5	.192**
Kokomo,Ind. C16	*.189¶*
Minnequa,Colo. C10	.192**
Monessen,Pa. P7	.191*
Pittsburg,Calif. C11	.207†
Rankin,Pa. A7	.187†
S.Chicago,Ill. R2	.187**
S.SanFrancisco C10	.196**
SparrowsPoint,Md. B2	.193*
Sterling,Ill.(1) N15	.191*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.181**
Aliq'ppa,Pa. 9-14½ga.J5	184§
Atlanta A11	.187
Bartonville,Ill. K4	.187
Crawfordsville,Ind. M8	*.187*
Donora,Pa. A7	.181†
Duluth,Minn. A7	.181†
Fairfield,Ala. T2	.181†
Houston,Tex. S5	.186**
Jacksonville, Fla. M8	*.192*
Johnstown,Pa.(43) B2	.185
Joliet,Ill. A7	.181†
KansasCity,Mo. S5	.186**
Kokomo,Ind. C16	*.189¶*
Minnequa,Colo. C10	.186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg Calif. C11	.204†
Rankin,Pa. A7	.181†
S.Chicago,Ill. R2	.181**
Sterling,Ill.(1) N15	.185*

	An'ld	Galv.
WIRE (16 Gage)	**Stone**	**Stone**
Ala.City R2	*.16.10*	*17.65***
Bartonville K4	.16.10	18.05
Buffalo W12	*.16.10*	
Cleveland A7		16.10
Crawf'dsville M8	*16.20*	*18.15*
Fostoria,O. 81	*.16.20*	*17.75¶*
Jacksonville M8	*16.45*	*18.40*
Johnstown B2	.16.10	18.05*
Kokomo C16	*.16.20*	*17.75¶*
Minnequa C10	.16.45	18.15**
Palmer,MassW12	*16.10*	*17.65**
Pitts.,Calif. C11	14.85	16.40†
SparrowsPt. B2	.16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	.16.10	17.65
Worcester A7	.16.40	

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala.	R2..8.10 8.50**
Aliquippa	J5 ....8.10 8.625§
Atlanta	A11 .....8.20 8.80
Bartonville(48)	K4..8.20 8.80
Buffalo W12	*.....8.10 8.50¶*
Cleveland A7	.....8.10 ...
Crawfordsville M8	*8.20 8.80*
Donora,Pa. A7	....8.10 8.50†
Duluth,Minn. A7	..8.10 8.50†
Fairfield T2	....8.10 8.50†
Houston(48)	S5 ..8.35 8.75**
Jack'ville,Fla. M8	*8.45 9.05*
Johnstown B2(48)	8.10 8.70*
Joliet,Ill. A7	....8.10 8.50†
Kans.City(48)	S5..8.35 8.75**
Kokomo C16	*.....8.20 8.60¶*
LosAngeles B3	..9.05 9.60*
Minnequa C10	..8.35 8.75**
Monessen P7 (48)	..8.10 8.70*
Palmer,Mass. W12	*8.40 8.80¶*
Pitts.,Calif. C11	..9.05 9.45†
Portsmouth,O. P12	8.00 ....
Rankin,Pa. A7	..8.10 8.50†
S.Chicago R2	...8.10 8.50**
S.SanFran. C10	..9.05 9.45**
SparrowsPt.	B2(48) 8.20 8.80*
Str'ling(1)(48)	N13 8.10 8.70*
Struth'rs,O.(48)	Y1 8.10 8.60†

Worcester,Mass. A7 8.40 8.80†

Based on zinc price of: *13.50c, †6c, ‡10c. §Less than 10c. ¶13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	195
Atlanta A11	197
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	*197*
Donora,Pa. A7	195
Fairfield,Ala. T2	195
Jacksonville,Fla. M8	*202*
Joliet,Ill. A7	195
Houston S5	200
KansasCity,Mo. S5	200
Kokomo, Ind. C16	*197*
Minnequa,Colo. C10	200
Pitts.,Calif. C11	199
S.Chicago R2	195
S.SanFran.,Calif. C10	219
SparrowsPoint,Md. B2	197
Sterling,Ill.(1) N15	195

FENCE POSTS

Chicago Hts.,Ill. C2, I-2	*167*
Duluth,Minn. A7	167
Franklin,Pa. F5	*167*
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	157
Minnequa,Colo. C10	172
Moline,Ill. R2	*172*
S.Chicago,Ill. R2	*167*
Tonawanda,N.Y. B12	*169*
Williamsport,Pa. S19	175

FASTENERS

Effective Aug. 24

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

Carriage, Machine Bolts

Full Size Body (cut thread)

6 in. and shorter:	
½ in. and smaller	58
⅝ in. thru 1 in.	46
Longer than 6 in.:	
½ in. and smaller	46
⅝ in. thru 1 in.	44
All lengths:	
1¼ in. and larger	44
Undersized Body (rolled thread)	
6 in. and shorter:	
½ in. and smaller	55

Carriage, Machine Bolts, Hot Galvanized:

6 in. and shorter:	
½ in. and smaller	35
⅝ in. thru 1 in.	20
Longer than 6 in.:	
½ in. and smaller	23
⅝ in. thru 1 in.	20
All Lengths:	
1¼ in. and larger	20

Lag Bolts

All diameters:	
6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

⅜ in. and smaller by 6 in. and shorter	54
Larger than ⅜ in. or longer than 6 in.	47

Blank Bolts — 47

Step, Elevator, Tire Bolts — 54

NUTS

Reg. & Heavy Square Nuts:

All sizes	59

Note: Revised price schedules are pending on following products.

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

STOVE BOLTS, SLOTTED

(Nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
⅜" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

MACHINE SCREWS, SLOTTED

(Bulk)

No. 2 to ¼" diam. incl.:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
⅜" to ½" diam. incl.:	
15,000 to 99,999 pieces	20
100,000 or more	27

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:

6" and shorter:	
¼" through ½" diam.	34
⅝" & ¾" diam.	31
⅞", 1"	8
Longer than 6":	
¼" through ⅝" diam.	3
¾" through 1" diam.	+13

High Carbon, Heat-treated:

6" and shorter:	
¼" through ½" diam.	20
⅝" & ¾" diam.	16
⅞", 1"	+11
Longer than 6":	
¼" through ⅝" diam.	+23
¾" though 1" diam.	+41

(New Std. Hexagon head, upset, bulk)

Bright:

½" x 6" & smaller & shorter	49
⅝", ½", ⅝" diam. x 6" & shorter	48
¾", ⅞", 1" x 6" & shorter	31

High Carbon, Heat-treated:

½" x 6" & smaller & shorter	41
⅝" x ½" diam. & 6" & shorter	39
¾", ⅞", 1" x 6" & shorter	20

H.P. Reg. & Heavy Hex Nuts:

¼" & smaller	64
⅜" to 1½" incl.	63
1¾" to 1½" incl.	60
1⅝" & larger	61

C.P. Reg. & Heavy Hex Nuts

¼" & smaller	64
⅜" & larger	61

Semifinished & Finished Nuts

¼" & smaller	66
⅜" & larger	63

Semifinished Slotted Reg. & Heavy Hex Nuts

¼" & smaller	64
⅜" & larger	63

(On above items, add 25% for less than case quantities)

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅜" incl., Square:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
No. 2 to ⅜" incl., Hex.:	
25,000 to 199,999 pieces	18
200,000 or more pieces	25

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.24	30.86	25.06
1¾	12	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2½	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Too Rolls All No. 2	Too Rolls 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	4.975	5.075	...(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

*Treated

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 8.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.348 in.; for gage 0.142 and lighter, 5.50c.
(15) ⅝" and thinner.
(16) 43 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Dedd. San Francisco Bay area.
(23) Special quality
(24) Deduct 0.25c, fine; than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.625c.
(27) Bar mill zone.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.50c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 8.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 16 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.020" and heavier, 0.25c higher.
(41) 8.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 1⅛-in. and smaller rounds; 7.95c over 1⅛-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	3.5	+10.25	8.25	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	3.5	....	8.25	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.25	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.25	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	*0*	*+19.25*	*3*	*+15.25*	*5.5*	*+11.75*	*8*	*+10*
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	*11*	*+19.5*	*1.5*	*+26*	*+7.5*	*+35*	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.66		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	*8.5*	*+9*	*9*	*+8.5*	*10.5*	*+7.75*	*10.5*	*+7.75*	*1*	*+17.75*	*1*	*+17.75*
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	25	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	....	39.25	41.25	45.25	45.25
301	20.50	25.25	....	....	34.00	38.50	40.50	....	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.75	43.75	....	....	....
304	23.25	29.25	36.00	....	39.75	41.00	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.50	50.50	53.25	57.75	57.75
305	24.75	32.50	....	....	43.00	41.00	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.75	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.75	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.75	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.75	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.25	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.75	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	....	....
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	....	....	....
420	....	32.25	33.00	....	40.25	38.00	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	....	....	....
431	....	27.25	35.50	....	....	39.75	41.75	43.50	....	....
446	....	....	37.75	....	56.75	42.75	44.75	46.00	67.25	80.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co., Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	33.25
304	34.50	41.50	35.25
304-L	37.20	44.65	....
316	38.70	46.65	52.25
316-L	45.70	54.35	....
316-CB	45.90	54.75	....
321	36.35	43.40	42.00
347	39.50	48.45	51.00
405	29.20	37.05	....
410	28.70	36.55	....
430	28.70	36.55	....
Inconel	52.50	68.45	....
Nickel	44.10	58.65	....
Nickel, Low Carbon	46.30	63.15	....
Monel	47.00	62.55	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	23.40	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	....	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	66.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. E2	62.50	....	63.00	....
S.Chicago,Ill Y1	62.50	63.00	63.00	....
S.Chicago U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee deld.	64.80	65.30	65.30	65.80
Muskegon,Mich. deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld	....	69.01	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks, deld.	....	64.10	64.10	64.62
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	64.76	64.76	65.29
Verona,Trafford, deld.	64.75	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O. deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. M1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.50%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R3 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.&	H.R. Alloy 4140††*		Carbon	Floor
Atlanta	8.07‡	9.27‡	9.83‡	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09*	15.69	8.87	8.12	9.56
Birmingham	7.65‡	8.85‡	8.85‡	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.75	10.92	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‡	9.10‡	9.10‡	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.70	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	13.89	8.55	8.33	9.49
Erie, Pa.	7.58	8.74	9.45††	....	7.81	7.85	...	8.60††	....	8.15	7.80	9.29
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00‡	9.20‡	9.22‡	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.05
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.37
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.63	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	....	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.55	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	80.00	7.88	7.91	8.44	8.60	13.65	8.05	8.01	9.26
Portland, Oreg.	8.95	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	9.75	10.30	10.80	....	8.95	8.50	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.25	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.31	10.43	...	....	8.90	8.74	...	9.90	....	9.02	8.64	11.18

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 25-cent bar quality extras; **½-in. and heavier; ††as annealed; §42 in. and under.
Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; *—400 to 999 lb; *—2000 to 3999 lb; *—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stephens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzels (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43. ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $36-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot), nom.	24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-33.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contract, nominally $1.35-1.40 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47% $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 3:1 0.	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.10

Antimony Ore

Per unit of 8lb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght. allowed	
Carlots	36.20
Toe lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-51.00†
Bronze, 5000-lb lots	61.25-65.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	59.25-62.25†
Phosphor-Copper, 5000-lb lots	67.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	81.32
Tin	14.50*
Zinc 5000-lb lots	19.75-23.00‡
Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

—Inches— Diam	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	27.50
Camden, N. J., ovens	28.50
Detroit, ovens	27.50
Pontiac, deld.	29.15
Saginaw, deld.	30.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N. J., ovens	28.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	29.50
Neville Island (Pittsburgh), Pa., ovens	28.25
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	*28.75*

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.05	$7.05	$7.05	$7.45
Bar Size Angles	6.90	6.90	6.90	7.30
Structural Angles	7.45	7.45	7.45	7.85
I-Beams	7.65	7.65	7.65	8.05
Plates	8.90	8.90	8.90	9.30
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1999 ft, ⅞ x 0.30 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	7.00	7.00	7.00	7.40
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	7.80	7.80	7.80	8.10
Oil Country Pipe: Mills withdrawn for remainder of the year.				

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.00; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $98.50; 19-21% Mn, 1-3% Si, $96; 16-19% Mn, $94.00.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridian, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 3c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 30.25c, 0.03% max 33.75c, 0.06% max 37.25c, 0.1% max 34.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 2.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.95c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ½" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 5% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 58c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ⅛-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.55c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

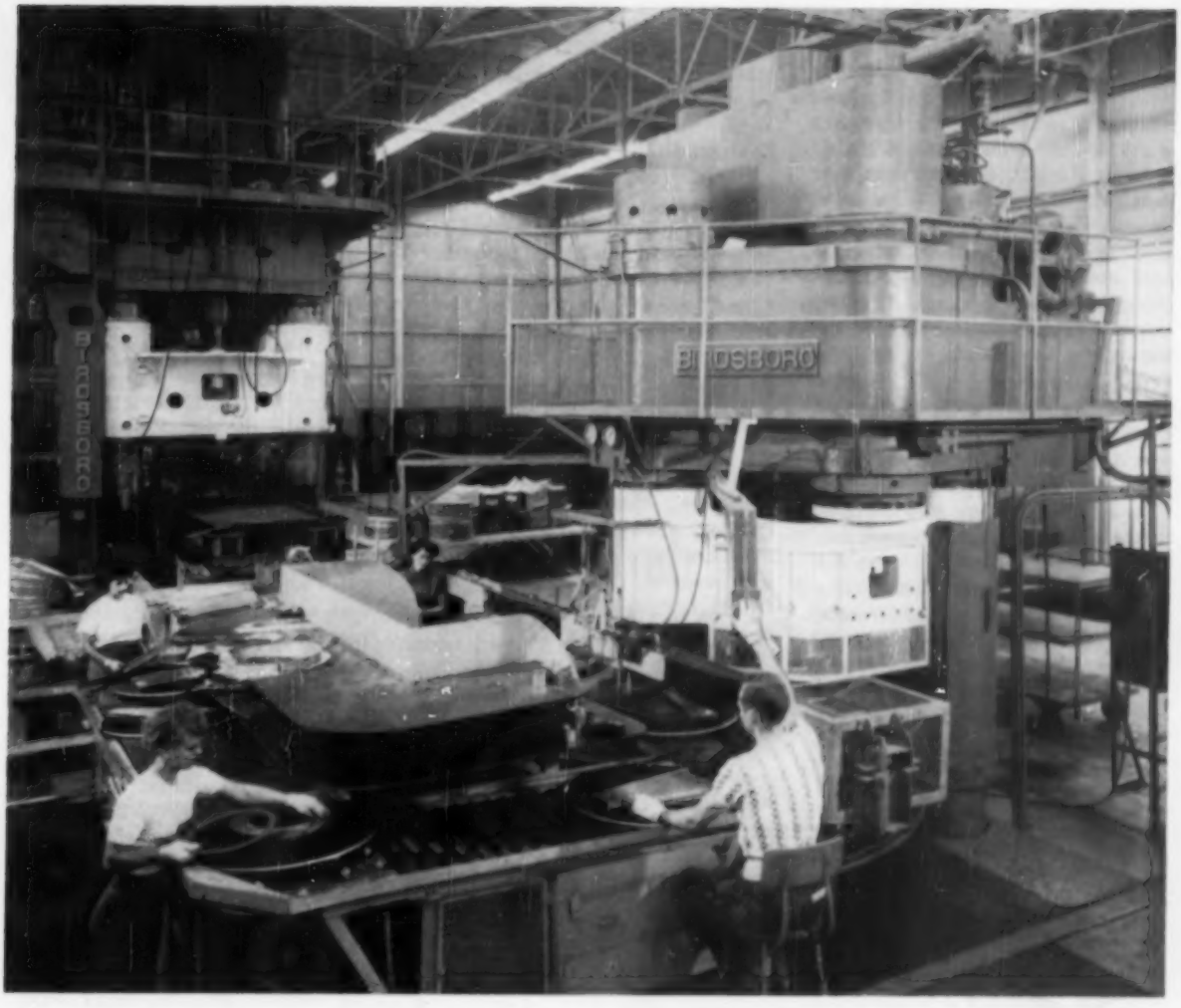
V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Sinaxal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, $1.54.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.31, f.o.b. Langeloth, Pa.; in bags, $1.30, f.o.b. Langeloth and Washington, Pa.



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- HYDRAULIC PRESSES *(Metalworking and Extrusion)*
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Pig Iron . . . .

Pig Iron Prices, Page 132

Of the Chicago district's 43 furnaces, 40 are operating: Inland Steel Co. has blown out its No. 3 Indiana Harbor blast furnace for repairs which will take about a month. Inventories in this district built up in June continue to hold down pig iron shipments, although August is running better than July. Demand should be normal by September.

A breakout in a blast furnace at the Ensley Works of U. S. Steel Corp.'s Tennessee Coal & Iron Division, Birmingham, has cut short hopes of early capacity production. It will probably take 30 days to get the furnace into operation.

The equalization area between Everett, Mass., and Buffalo has been extended in favor of Everett, as a result of recent price increases and earlier freight rate advances. While the Rutland, Vt., district's delivery is lower for Buffalo, shipments from Everett to Connecticut, western Massachusetts, Rhode Island and most other New England consuming points are lower. Upstate New York iron went up $2.50 a ton and Everett, $1.25.

Buffalo district inventories of pig are starting to dwindle from prestrike highs. Sizable orders for castings are on the foundries' books. Steel mills continue to use almost all of their pig in their open hearths.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 133

The foundry coke price at the Terre Haute, Ind., ovens was raised $2 a ton, effective as of Aug. 2. Demand for fuel during August has been light, but still shows an improvement over that in July. Orders for September are expected to show further gain.

Work has started on reconstruction of No. 6 coke oven battery at the Fairfield (Ala.) Coke & Chemical Works, Tennessee Coal & Iron Division, U. S. Steel Corp. The present battery is 37 years old. The new battery will have 77 ovens and will be built on the present site. Construction is expected to require eight or nine months. The ovens will be equipped with self-sealing doors, door machines, coke guide, coke pusher and leveler and other related modern equipment.

Wire . . .

Wire Prices, Pages 129 & 130

Wire producers are assigning capacity for fourth quarter orders previously booked. While part of this tonnage will be processed in September, many producers will not be current until October. New buying is increasing moderately, but consumers have ample inventories and are cautious in making new commitments. By the time most users expect to enter the market actively production will have attained a level sufficiently high to meet demand for most products.

Easily-installed units for high-efficiency air movement in all duct systems. Direct-driven types for atmospheres within safe motor operating limits or belted models for hazardous fumes, vapors and excessive temperatures. Sizes 12" to 84" with 2, 4, 6, or 7 blades. Capacities to 120,000 C.F.M.

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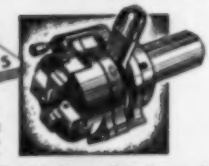

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Scrap Jumps to All-Time High

STEEL's price composite on steelmaking grades of $58.17 a ton is 28 per cent above July's strike-imposed low of $45.50. Pending heavier purchases by leading mills may send market higher

Scrap Prices, Page 138

Philadelphia—The steel scrap price tone is strong, with the trend upward. Several grades advanced $1 a ton last week; No. 2 heavy melting steel and bundles rose $2, as did railroad specialties and rail crops. Cast scrap prices are steady and for the most part unchanged.

New York—Brokers continue to boost their buying prices. Minimum increases were $1 a ton. Heavy export demand, coupled with expectations for a high level of steelmaking operations, indicate that prices may continue their advance.

Pittsburgh — Increasing activity in neighboring areas is reflected in this area indirectly. There have been no important mill purchases within the last two weeks, but it's now estimated by brokers that mills would have to pay more than $56 for No. 1 heavy melting steel if they entered the market this week. Most say No. 1 heavy melting commands a theoretical price of $58 a ton, with punchings and plate scrap and electric furnace bundles selling for $11 a ton more.

Turnings and borings are level, with slow demand. Other grades are increasing rapidly in price, with $75 paid for railroad specialties.

Boston — Heavy melting steel scrap for shipment to eastern Pennsylvania is $1 a ton higher. No. 2 grade is up $2. For shipment outside, brokers pay $3 to $4 under district consuming points. For district consumption, prices are unchanged at shipping point, except for borings and turnings. They are up $1.50 a ton for short shoveling turnings. In effect, there are three price base levels in New England (1. District consumption. 2. Export dock. 3. Pennsylvania shipments), with spreads of $3 to $4 a ton. District consumption commands top bids, and export is in between, but both are within $4 to $5 freight.

Buffalo—No. 1 heavy melting steel scrap advanced another $2 a ton here last week. A sizable tonnage was purchased by a principal user. No. 1 bundles and No. 1 busheling also advanced $2. Other mill grades remain unchanged.

There still has been no sizable new business in blast furnace grades, with mills and dealers unable to get together on prices. Cast scrap is up $2 a ton on a purchase of No. 1 cupola at $48. No. 1 machinery is quoted higher at $54.

The market here appears to be

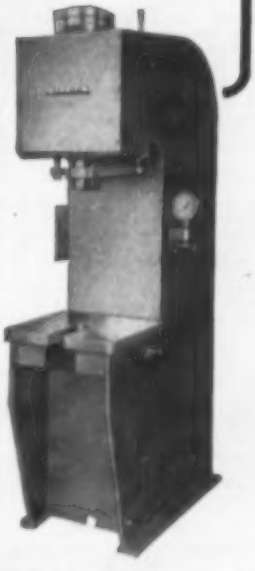
(*Please turn to page* 143)

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON	$ 552
2-TON	$ 627
5-TON	$1,306
8-TON	$1,356
10-TON	$1,855
25-TON	$3,401

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 22	$58.17
Aug. 15	56.67
July Avg.	47.70
Aug. 1955	43.97
Aug. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*57.00-58.00*
No. 2 heavy melting	*49.00-50.00*
No. 1 bundles	*57.00-58.00*
No. 2 bundles	*45.00-46.00*
No. 1 busheling	*57.00-58.00*
Machine shop turnings	36.00-37.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	40.00-41.00
Cast iron borings	40.00-41.00
Cut structurals, 3 ft lengths	*58.00-60.00*
Heavy turnings	*50.00-51.00*
Punchings & plate scrap	*58.00-60.00*
Electric furnace bundles	*58.00-60.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Charging box cast	*48.00-49.00*
Heavy breakable cast	*48.00-49.00*
Unstripped motor blocks	*35.00-36.00*
No. 1 machinery cast	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-67.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	*72.00-73.00*
Railroad specialties	*74.00-75.00*

Stainless Steel Scrap

18-8 bundles & solids	375.00-385.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	61.50-62.50
No. 2 heavy melting	44.00-45.00
No. 1 bundles	61.50-62.50
No. 2 bundles	40.00-41.00
No. 1 busheling	61.50-62.50
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	67.00-68.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	62.50-63.50

Cast Iron Grades

No. 1 cupola	56.00-57.00
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	55.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	80.00-81.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	75.00-76.00
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	74.00-75.00
Rails, rerolling	75.00-76.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	105.00-110.00
430 turnings	58.00-60.00

YOUNGSTOWN

No. 1 heavy melting	64.00-65.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	64.00-65.00
No. 2 bundles	43.00-44.00
No. 1 busheling	64.00-65.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	65.00-66.00

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	58.00-60.00
No. 2 heavy melting	47.00-48.00
No. 1 factory bundles	62.00-63.00
No. 1 dealer bundles	58.00-57.00
No. 2 bundles	43.00-44.00
No. 1 busheling	58.00-60.00
Machine shop turnings	33.00-34.00
Mixed borings, turnings	35.00-36.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft	*66.00-67.00*
Punchings & plate scrap	*67.00-68.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	47.00-48.00
Unstripped motor blocks	41.00-42.00
Clean auto cast	57.00-58.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	61.00-62.00
R.R. malleable	*71.00-72.00*
Rails, 2 ft and under	80.00-81.00
Rails, 18 in. and under	81.00-82.00
Angles, splice bars	73.00-74.00
Rails, rerolling	*83.00-84.00*

Stainless Steel Scrap

18-8 bundles & solids	405.00-425.00
18-8 turnings	310.00-325.00
430 bundles & solids	105.00-110.00
430 turnings	52.50-57.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*54.00*
No. 2 heavy melting	43.00
No. 1 bundles	54.00
No. 2 bundles	39.00
No. 1 busheling	*54.00*
Machine shop turnings	29.00
Mixed borings, turnings	*32.00*
Short shovel turnings	*54.00*
Punchings & plate scrap	57.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	*25.00-26.00*
Short shovel turnings	29.00-30.00
Machine shop turnings	*29.00-30.00*
Electric furnace bundles	*51.00-52.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	51.00-52.00
Stove plate	49.00-50.00
Bar Crops and plate	55.00-56.00
Structural & plate, 2 ft	54.00-55.00
Unstripped motor blocks	41.00-42.00
Charging box cast	35.00-36.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	59.00-51.00
Rails, 18-in. and under	*65.00-66.00*
Rails, rerolling	*71.00-72.00*
Rails, random lengths	*61.00-62.00*
Angles, splice bars	*61.00-62.00*

PHILADELPHIA

No. 1 heavy melting	*58.00*
No. 2 heavy melting	*49.00*
No. 1 bundles	*58.00*
No. 2 bundles	*47.00*
No. 1 busheling	*58.00*
Electric furnace bundles	59.00
Mixed borings, turnings	38.00
Machine shop turnings	*32.00-39.00*
Short shovel turnings	*44.00*
Heavy turnings	*54.00*
Structurals & plates	*61.00-62.00*
Couplers, springs, wheels	*60.00*
Rail crops, 2 ft & under	*72.00-73.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Malleable	68.00
Heavy breakable cast	55.00
Drop broken machinery	58.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*53.00*
No. 2 heavy melting	*42.00*
No. 1 bundles	*52.00*
No. 2 bundles	*40.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	*35.00-36.00*
Low phos. (structural & plate	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-51.50
No. 2 heavy melting	38.00-39.00
No. 1 bundles	51.00-51.50
No. 2 bundles	34.00-35.00
No. 1 busheling	51.00-51.50
Machine shop turnings	26.00-27.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	*33.00*
No. 1 cast	43.00-43.50
Mixed cupola cast	38.50-39.00
No. 1 machinery cast	44.50-45.00

BUFFALO

No. 1 heavy melting	*56.00-57.00*
No. 2 heavy melting	43.00-44.00
No. 1 bundles	*56.00-57.00*
No. 2 bundles	40.00-41.00
No. 1 busheling	*56.00-57.00*
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	58.00-59.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*47.00-48.00*
No. 1 machinery	*53.00-54.00*

Railroad Scrap

Rails, random lengths	58.00-59.00
Rails, 3 ft and under	64.00-65.00
Railroad specialties	57.00-58.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	54.50-55.50
No. 2 heavy melting	45.00-46.00
No. 1 bundles	54.50-55.50
No. 2 bundles	40.50-41.50
No. 1 busheling	54.50-55.50
Machine shop turnings	32.50-33.50
Mixed borings, turnings	34.50-35.50
Short shovel turnings	36.50-37.50
Cast iron borings	34.50-35.50
Low phos., 18 in.	59.00-60.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	46.00-47.00
Charging box cast	46.00-47.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	59.00-60.00
Rails 18 in. and under	74.00-75.00
Rails random lengths	65.00-66.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	42.00
No. 2 heavy melting	40.00
No. 1 bundles	46.00
No. 2 bundles	36.00
No. 1 busheling	46.00
Machine shop turnings	26.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	42.00
Heavy breakable cast	42.00
Unstripped motor blocks	39.00
Brake shoes	49.50
Clean auto cast	50.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	59.00
Rails, 18 in. and under	72.00
Rails, random lengths	70.00
Rails, rerolling	78.00
Angles, splice bars	70.00

SEATTLE

No. 1 heavy melting	46.00
No. 2 heavy melting	42.00
No. 1 bundles	42.00
No. 2 bundles	31.00
Machine shop turnings	25.00-27.00
Mixed borings, turnings	25.00-27.00
Electric furnace No. 1	54.00-56.00

Cast Iron Grades

No. 1 cupola	45.00-47.00
Heavy breakable cast	40.00-42.00
No. 1 wheels	37.00
Unstripped motor blocks	42.00
Stove plate (f.o.b. plant)	33.00-35.00

LOS ANGELES

No. 1 heavy melting	*44.00*
No. 2 heavy melting	*40.00*
No. 1 bundles	*43.00*
No. 2 bundles	*33.00*
Machine shop turnings	*25.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00

SAN FRANCISCO

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 2 bundles	35.00
Machine shop turnings	25.00
Mixed borings, turnings	25.00
Cast iron borings	25.00
Heavy turnings	25.00
Short shovel turnings	28.00
Cut structurals	52.00-54.00

Cast Iron Grades

No. 1 cupola	52.00
Charging box cast	49.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	43.00
Clean auto cast	52.00
No. 1 wheels	45.00-47.00
Drop broken machinery	52.00

HAMILTON, ONT.

No. 1 heavy melting	*49.00*
No. 2 heavy melting	*44.00*
No. 1 bundles	*49.00*
No. 2 bundles	*41.50*
Mixed steel scrap	*43.00*
Busheling, new factory:	
Prepared	*47.00*
Unprepared	*43.00*
Short steel turnings	*34.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.

for complete service
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STAINLESS and ALLOY STEEL SCRAP

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IMPORT & EXPORT — **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Copper Shows Signs of Life

Beginning of 1957 model run by auto producers brings domestic market out of the doldrums. Foreign market still sluggish despite Suez crisis

Nonferrous Metal Prices, Pages 142 & 143

WEAKNESS in the domestic copper market may disappear within the next two or three weeks.

Dashboard and radiator manufacturers (large users of the red metal) are already in the panic stage to meet delivery deadline for test models of '57 autos. Reports one mill: "We (the mills) can pick up all the surplus the custom smelters have on hand as soon as Detroit gives us the sign." The head of a custom smelter firm says: "Our copper and brass shipments have improved in the last ten days. While the Suez crisis has provided an artificial stimulus, we know that the first automotive orders are being received by our customers."

Meanwhile — The London Metal Exchange quotation reflected a hesitancy on the part of Europe to buy copper. Bid quotation was 37.125 cents a pound Wednesday. Custom smelters in this country varied prices from 39.50 cents a pound to 39.75 cents a pound. While copper and brass mills are beginning to recover, wire and cable producers continue at full tilt.

U. S. refined copper production during July, reports the Copper Institute, was 125,401 tons. June total: 136,713 tons. Deliveries to fabricators during July dropped to 97,698 tons from June shipments of 131,299 tons. World refined production was 240,633 tons, a drop of 10,749 tons from the June total.

Aluminum: A New Record

U. S. primary aluminum production broke its monthly record during July for the third time this year. July production: 151,624 tons. Previous monthly records had been set in May (150,800 tons) and March (145,895 tons).

Aluminum producers may be hard pressed to fill orders for the remainder of the year. Reasons: 1. Demand is still strong. 2. Shutdown of Reynolds Metals Co. facilities (strike by United Steelworkers) will tighten supply in the third quarter.

Expansion Note: Rumors flew around Wall St. during the week that Olin Mathieson Chemical Corp. and Revere Copper & Brass Inc. will join forces to bring in an additional 120,000 tons of aluminum pig and ingot capacity. Olin Mathieson has 60,000 tons under way in the Ohio valley. While company spokesmen would not confirm the rumor, both firms did admit that they had entered into "serious discussions." Look for announcements soon that Olin Mathieson's present Ohio valley site will have a capacity of 180,000 tons by 1958 rather than the planned 60,000 tons.

Lead, Zinc Sales Bright

Lead sales have new life. Battery makers have entered the market for substantial tonnages. Reports one lead man: "It looks as though the battery manufacturers are returning to the prewar philosophy of making 30 per cent of their batteries during the first half of the year, 70 per cent in the third and fourth quarters." Most producers report sales are more than satisfactory across the board.

Zinc sales to galvanizers are strong. Steel mills are placing orders rapidly as they watch order books for the fourth quarter fill up. Special high grade (for diecasting) is still weak but is showing signs of recovery. Motordom holds the cure.

BDSA Frees Nickel Anodes

The government removed nickel anodes from the list of materials that must be set aside at foundries and mills for defense use. This permits defense contractors once again to obtain anodes by indicating defense or atomic energy priority.

The change, says Business & Defense Services Administration, is made because of a technicality in definition. Nickel anodes should not have been on the list at all because they are by definition finished products.

Market Memos

- One topic to be discussed at the 12th annual convention of the Magnesium Association (Oct. 4, Chicago): Selection of magnesium for the skin of the outer space satellite to be launched in '57.
- Brass and bronze ingot shipments were 17,364 tons in July. This compares with shipments of 18,842 tons in June.

NONFERROUS PRICE RECORD

	Aug. 8 Price	Last Change		Previous Price	July Avg.	June Avg.	Aug. 1955 Avg.
Copper	39.50-40.00	Aug.	17, 1956	39.75-40.00	40.030	43.000	37.750
Lead	15.80	Jan.	13, 1956	16.30	15.880	15.880	14.800
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	12.500
Tin	99.375	Aug.	22, 1956	99.00	98.433	94.611	98.519
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	25.900	25.900	24.267
Magnesium	35.25	Aug.	13, 1956	33.75	33.750	33.750	30.574

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.

Bridgeport Alloys Help Put Hot 'N Cold in New Fountain

The new "Vanishing Americans"—employees who leave the office for morning and afternoon coffee-breaks—cost business an estimated $900,000,000 annually in lost time. To make coffee-time a pleasure and keep employees on the job, Ebco Manufacturing Company of Columbus, Ohio, has developed the Oasis Hot 'N Cold—an office water cooler that not only supplies cold water, but also dispenses piping hot water for instant beverages.

Bridgeport found material requirements for the hot and cold water tanks presented an interesting metallurgical problem; practically no camber is allowable since the tanks are roll-formed into cylinders and brazed together. The domes and bases of these tanks are drawn slightly and then are brazed together.

The metal supplied had to be *exactly the right temper* and with minimum camber. Bridgeport's Red Brass Alloy #85 was recommended to meet these requirements and also to provide high strength, fine ductility and resistance to season cracking.

In addition to Red Brass Alloy #85, Bridgeport also supplies a variety of copper and brass items for use in the Hot 'N Cold and in Ebco's line of dehumidifiers. Ebco uses Bridgeport Tubular Plumbing—P-Traps, Cast Traps, Drain Tubes, Waste Tubes, Inlet Tubes, as well as Copper Fin stock, Red Brass Baffle stock and similar plumbing and mill products.

Each Bridgeport product is *matched exactly to the job it is expected to do.* This assures manufacturing ease, maximum economy and customer satisfaction. The same skilled technical advice ... the same dependable source of high-quality metals are as near as your telephone. Phone or write your nearest Bridgeport Sales Office today.

How to Braze Copper-Base Alloys

In brazing, the filler used is a non-ferrous metal and melts above 800°F but below the melting point of the metals being joined. On the production line and in the maintenance shop, four essentials are necessary for a strong bond:

CLEANING. Grease, oil, oxides and other foreign matter must be removed. Visual inspection will not detect all oxides; only filing, grinding or a bright dip will effectively remove oxides. Since it is nearly impossible to remove all traces of an acid-base flux in production work, such traces will cause future corrosion.

FLUXES. The main purpose of a flux is to protect parts with an air-excluding film since oxidation is increased rapidly when heat is applied. Fluxes should melt well below the melting point of the solder and should be stable at temperatures in excess of the melting point of the solder. Calcined borax and powdered boric acid are two commonly used fluxes.

CONTACT. Because brazing metal flows by capillary action, the parts being joined must be held closely together to allow the molten bonding material to flow between the parts. Clearances of .003 to .008 at welding temperature are recommended.

TEMPERATURE. Parts should be heated slightly above the melting point of the brazing material. A gas-air or gas-oxygen flame is normally used, although oxyacetylene torches can be used with care. Red heat is needed for this type of joining. Too high a temperature will burn off the flux and cause the metal to oxidize, weakening the bond. Use a reducing flame (excess of fuel in the fuel-to-air ratio) or a neutral one. In furnace brazing, a reducing atmosphere helps prevent oxidation and removes any oxide which may be left on the metal.

Bridgeport has a new Bronze Welding folder that's yours for the asking. Write today for your copy. (011)

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY ♦ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 26.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 50-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 32.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. Reading, Pa., or Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $110.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 39.50-39.75 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 +%, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$267 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.33 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.65 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 90.375; prompt, 89.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.00; grade A-3 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10.00 per lb; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-30.75; No. 12 foundry alloy (No. 2 grade), 26.50-27.00; 5% silicon alloy, 0.60 Cu max, 28.25-28.50; 13 alloy, 0.60 Cu max, 28.25-28.50; 195 alloy, 28.75-29.00; 108 alloy, 27.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.00, grade 2, 26.25; grade 3, 25.50; grade 4, 25.00.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow No. 405, 29.75; manganese bronze, No. 421, 33.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 46.35c; l.c.l., 46.95. Weatherproof, 30,000-lb lots, 43.75; l.c.l., 44.55. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.45.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.60; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	96
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base;

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	58.10
1.125-1.500	55.20	53.90	59.00	58.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	54.20
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.50-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.80
0.023-0.019	45.80-52.20	42.60
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.05
0.007	56.50	51.80
0.006	58.10	53.20

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.00-16.50; old sheets, 13.00-13.50; borings and turnings, 9.00-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	SCRAP ALLOWANCES f Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.83	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass, 80%	56.85	56.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.64	33.125	32.875	32.375
Manganese Bronze	49.46	53.56	63.80	....	28.250	28.000	24.500
Muntz Bronze	53.84	49.85	....	....	28.625	28.375	24.875
Naval Brass	55.72	50.08	62.73	58.88	25.250	25.000	24.500
Silicon Bronze	65.23	64.41	65.26	67.28e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.06g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

9.50; crankcases, 13.00-13.50; industrial castings, 13.00-13.50.

Copper and Brass: No. 1 heavy copper and wire, 32.00-32.50; No. 2 heavy copper and wire, 29.50-30.00; light copper, 27.00-27.50; No. 1 composition red brass, 25.50-26.00; No. 1 composition turnings, 24.50-25.00; yellow brass turnings, 15.00-15.50; new brass clippings, 23.00-23.50; light brass, 15.00-15.50; heavy yellow brass, 17.00-17.50; new brass rod ends, 20.50-21.00; auto radiators, unsweated, 19.00-19.50; cocks and faucets, 19.50-20.00; brass pipe, 21.50-22.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 14.50.

Monel: Clippings, 55.00-65.00; old sheets, 55.00-75.00; turnings, 60.00-70.00; rods, 55.00-65.00.

Nickel: Sheets and clips, 120.00-190.00; rolled anodes, 120.00-190.00; turnings, 100.00-150.00; rod ends, 120.00-190.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 21.00-21.50; 3003 clippings, 20.75-21.50; 6151 clippings, 20.75-21.50; 5052 clippings, 20.75-21.50; 2014 clippings, 20.25-20.50; 2017 clippings, 20.25-20.50; 2024 clippings, 20.25-20.50; mixed clippings, 19.25-20.50; old sheets, 17.75-19.00, old cast, 17.75-19.00; clean old cable (free of steel), 19.50-21.50; borings and turnings, 17.25-20.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 35.00; No. 2 heavy copper and wire, 32.00; light copper, 29.75; refinery brass (60% copper) per dry copper content, 31.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 35.00; No. 2 heavy copper and wire, 32.00; light copper, 29.75; No. 1 composition borings, 28.50; No. 1 composition solids, 29.50; heavy yellow brass solids, 19.50; yellow brass turnings, 18.50; radiators, 22.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 50.28; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. Prices eastern delivery.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1999 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 42.50; 400-4900 lb, 41.50; 5000-9999 lb, 39.5; 10,000 lb and over, 38.50; prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-25,900 lb, 31.25; 26,000 lb, 30.25; prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 70.90; 100-400 lb, 62.50; 700-1900 lb, 60.00; 2000-9900 lb, 58.30; 10,000 lb or more, 57.10.

Stannous Chloride (anhydrous): Less than 25 lb, 167.70; 25 lb, 132.70; 100 lb, 117.70; 400 lb, 115.30; 5200-19,600 lb, 103.10; 20,000 lb, 99.90.

Stannous Sulphate: Less than 50 lb, 130.40; 50 lb, 100.40; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Continued from page* 137)

leveling off to some extent around current figures, and there is greater stability in prices. The undertone remains firm, and demand is expected to continue heavy through the end of the year.

Youngstown—Prices have soared since the end of the steel strike. One major scrap consumer purchased a substantial tonnage of No. 1 heavy melting scrap at $65, but it was a special sale with the company specifying industrial scrap only. Two other firms bought at $62 and $63 for No. 1 heavy melting and $1 or so less for bundles. A blast furnace operator paid $40 a ton for short shovelings.

Chicago—Purchases of the leading steelmaking grades by two important mills in this district did much to stabilize the market. Essentially industrial material was involved, leaving dealer grades at uncertain price levels. Brokers' offering prices provide the only yardstick of the worth of these grades.

(*Please turn to page* 144)

CLASSIFIED

Help Wanted

STEEL FABRICATOR:
Have opening for high class man experienced in Steel and Alloy plate fabrication. Pressure vessels, tanks, etc. This man may be either a graduate engineer or with engineering experience in this field. Estimating, purchasing, design, shop drawings will be his responsibility. Good starting salary with opportunity to assume place in Management. Give full work history and education in answering. Reply to: Kickham Boiler & Sheet Iron Works, Inc., 2515 North 28th St., St. Louis 6, Missouri.

PRODUCTION MANAGER
Large alloy foundry in Middlewest desires Production Manager. Must be thoroughly experienced. Send complete resume to Box 457, STEEL, Penton Bldg., Cleveland 13, Ohio.

CORE ROOM FOREMAN
For large alloy foundry in Middlewest. Must be thoroughly experienced. Send complete resume to Box 458, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLEANING ROOM FOREMAN
For large alloy foundry in Middlewest. Must be experienced. Send complete resume to Box 459, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOREMAN
Large alloy foundry in Middlewest desires Foundry Foreman. Must be thoroughly experienced. Complete resume to Box 460, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

APPLIANCE ENGINEER: CHIEF LEVEL. AGE 55. 20 YEARS EXPERIENCE ON HEATING APPLIANCES, FANS, MIXERS, FRACTIONAL MOTORS. PRACTICAL TOOL, DIE MAKER. MIDWEST PREFERRED. BOX 462, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

LAYOUT MAN

WANTED BY WELL ESTABLISHED STEEL FABRICATORS IN CONNECTICUT. EXCELLENT OPPORTUNITY.

Write Box No. 452, STEEL
Penton Bldg. Cleveland 13, Ohio

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

DIRECTOR OF PURCHASES

A long-established, successful and progressive company designing and manufacturing heavy machinery is seeking a Director of Purchases.

We want a man in his early thirties and at present employed. A knowledge of the Steel and Heavy Machine Industries would be advantageous but is by no means a necessity.

He should have a sound background of training and experience in the routine of purchasing and expediting. He must be aggressive, ambitious and capable of assuming full responsibility for the prudent handling of an expenditure of from five to six million dollars a year.

Such a man will find an unusual opportunity to work out his own bless and his future in congenial surroundings and under favorable terms.

Replies will be kept confidential and should give complete details of family and educational background, experience and reasons for seeking the change.

Reply Box No. 456, STEEL,
Penton Bldg. Cleveland 13, Ohio

LUBRICATION ENGINEER

Southern California concern operating a large variety of heavy machinery and mobile equipment has technical staff position open for qualified man with mechanical or chemical engineering degree, or equivalent. Must be able to prescribe correct lubricants and lubricating methods, write specifications and schedules, oversee lubricating costs and standards in wide range of usage. State experience, age, training, etc.

WRITE BOX 442, STEEL

Penton Bldg. Cleveland 13, Ohio

FOR SALE

MESTA 2000 TON HYDRAULIC FORGING PRESS, bed 5' LR x 58" FB. Daylight 111", 60" stroke. Fully equipped. 4 column type, 19" column. Now setup in Navy plant. Recently rebuilt. Price $23,500.

EVEREADY, P. O. BOX 6518, BRIDGEPORT, CONN.
EDison 4-9471

FOR SALE

2061 pounds (42 Sheets 29¾" x 120" x .045") Timken 16-25-6 Stainless Steel For High Temperature Application. Certificates of Analysis and Properties on hand.

GEO. W. GAYLE & SON
Frankfort, Kentucky
Tel. 4-2969

weldments as you want them...

For half a century, Kirk & Blum skilled craftsmen have been saving time and money for outstanding manufacturers. Whatever the weldment required, these experienced artisans know the most efficient technique to do the job accurately and quickly.

This know-how, plus modern Kirk & Blum equipment, assures high quality sheet steel and alloy fabrication.

Fabrication of guards, tanks, machine bases . . . all types of semi-finished and finished weldments . . . are available from Kirk & Blum to your exact needs.

Let K & B bring your drawings to life. Write for booklet, or send your prints for prompt quotation.

THE KIRK & BLUM MFG. CO.
3226 Forrer Street
Cincinnati 9, Ohio

KIRK & BLUM
SHEET & PLATE FABRICATION

(*Concluded from page* 143)

Railroad material, measured by this yardstick, continues to move to fantastic levels.

Detroit—The market is fairly steady here, although a few grades advanced $1 to $2 a ton. The trend is expected to continue upward for the balance of this month. Punchings and plate scrap show little activity, with the price quoted $57, although special lots to small foundries have run as high as $68 to $70.

Cincinnati — After rising sharply last week, steel scrap prices settled down. Demand continues active. The higher price level has stimulated the inflow of scrap from generators.

Birmingham — Movement to the major open-hearth consumer here is light. The export market remains strong, with prices rising $3 to $4 a ton on No. 1 and 2 heavy melting steel for late September-October shipment. Electric furnace grades are strong. Movement of these grades to mills is fair. Cast iron grades are strong and are moving freely to most foundries. Some foundries have adequate inventories

Los Angeles — The price trend has turned downward, following initial poststrike increases. Dealers look for continued rapid changes for several weeks before the market stabilizes.

San Francisco — Steel scrap is holding its recent price advances. The movement of material is steady, and the market tone is firm.

Seattle—The market is active, following the recent $2 a ton increase in steelmaking grades. Domestic users as well as exporters are making purchases.

Full cargo ship charters are numerous at current high ocean rates. Ships are scarce, and owners' ideas on rates are firming. Trans-Pacific charters from the Pacific Northwest to Japan range from $180,000 to $190,000 per carrier, free load and discharge. On a ton basis, charters are reported at $16.50 for scrap; $13 for ore from Stockton, Calif. Gulf to Japan for scrap is quoted $260,000. Pig iron (Chile to Japan) was closed at $238,000 for a full cargo while the same commodity (Montreal, Canada, to Japan) was $21 a long ton.

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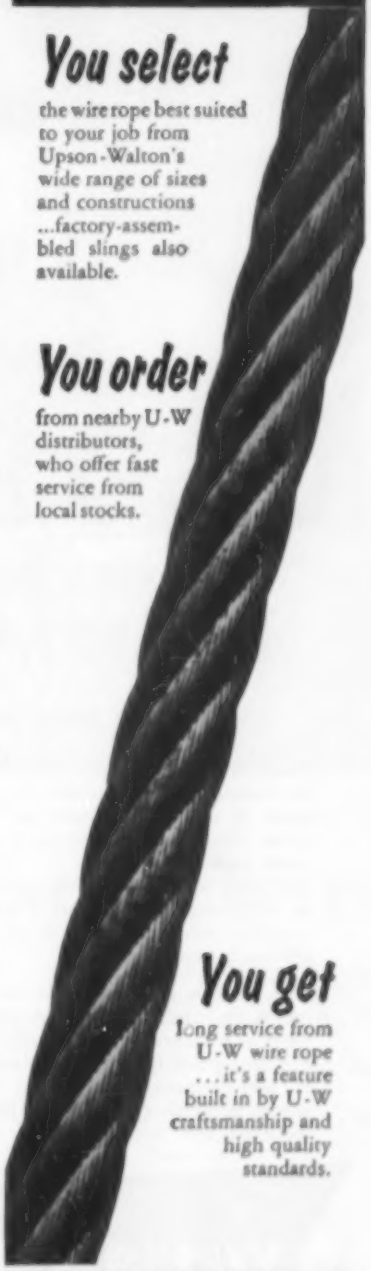
UPSON-WALTON
wire rope



You select

the wire rope best suited to your job from Upson-Walton's wide range of sizes and constructions ...factory-assembled slings also available.

You order

from nearby U-W distributors, who offer fast service from local stocks.

You get

long service from U-W wire rope ...it's a feature built in by U-W craftsmanship and high quality standards.

THE UPSON-WALTON COMPANY
12500 ELMWOOD AVE. • CLEVELAND 11, OHIO
New York • Chicago • Pittsburgh
MANUFACTURERS OF
WIRE ROPE, ROPE FITTINGS, TACKLE BLOCKS
ESTABLISHED 1871

WHEELABRATOR® DESCALES STRIP 50% to 100% FASTER ELIMINATES SCALE BREAKING, REDUCES ACID PROBLEMS

Preparing stainless for cold-rolling in a Prominent Steel Plant

Better cleaning at lower cost was the immediate result of the installation of the Wheelabrator mechanical descaling process to augment pickling in each of four strip lines by a major steel producer. Chrome and chrome-nickel stainless coils are cleaned in preparation for cold rolling.

This process eliminates the cold mill scale breaking operation previously required on the straight chrome series of stainless steels. It also reduces the number of passes through the cleaning line required for surface defect removal. These benefits account for approximately 50% of the total savings achieved.

In addition, only two pickle tanks on each line are required instead of three used formerly. Fewer tanks mean less acid used. Less acid used means less acid for disposal, registering additional significant savings. At the same time production has been greatly increased because of the 50% to 100% faster cleaning speed of the Wheelabrator lines compared to straight pickling.

Descaling stainless steel strip is only one of the highly successful applications of Wheelabrator blast cleaning in steel finishing and processing — more than 70 Wheelabrator Cabinets are in use for such jobs as descaling carbon strip, sheet, slabs, billets, wire rod, structural steel shapes, etching mill rolls, etc.

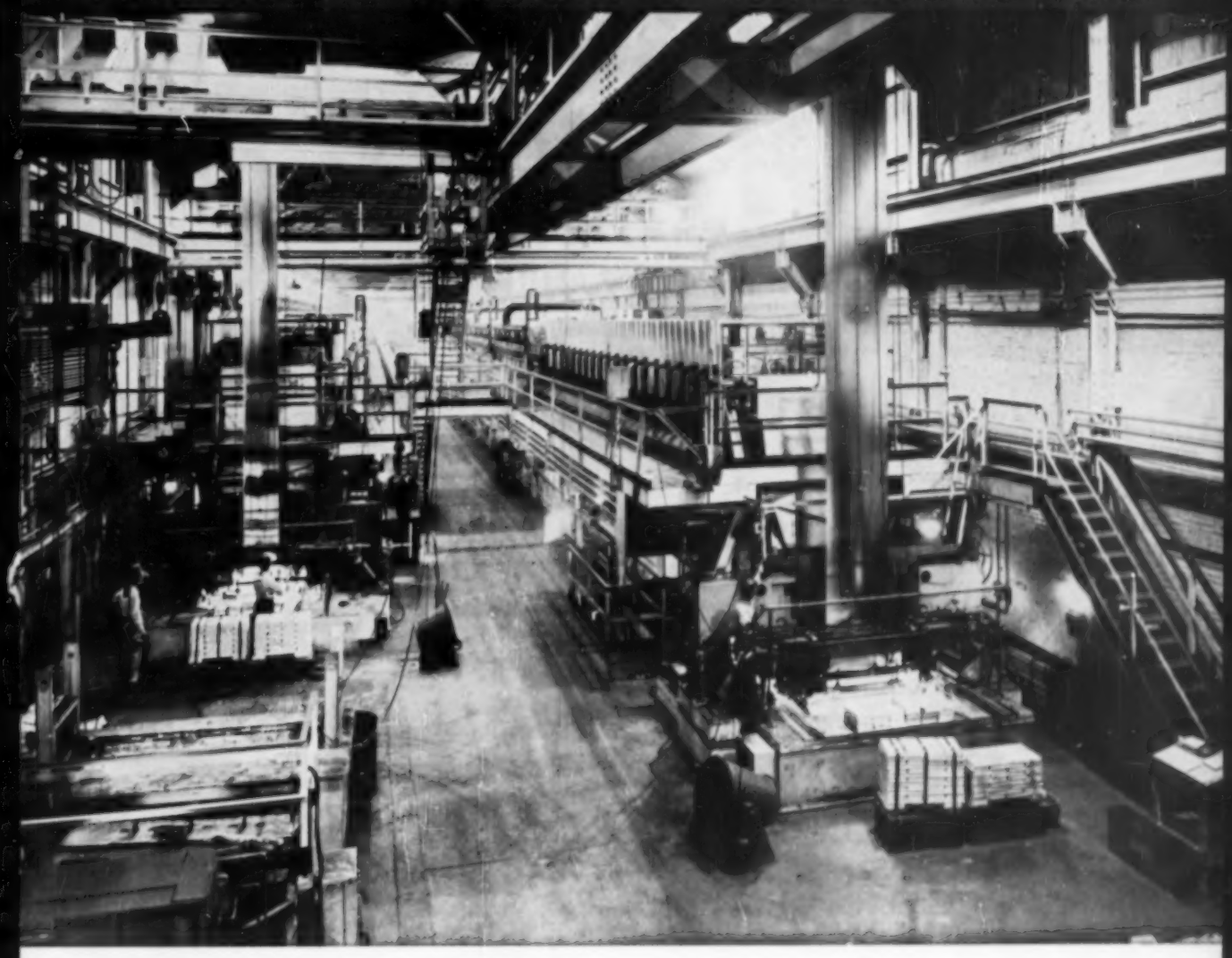
For similar benefits in your own plant adopt this modern method of strip and sheet steel descaling. For more information, send today for Catalog 864.

WHEELABRATOR
CORPORATION

Leaders in the field of mechanical descaling

509 S. Byrkit Street, Mishawaka, Indiana

PIONEERS IN CONTINUOUS GALVANIZING LINES



CONTINUOUS—
Galvanizing at INLAND STEEL

● Inland Ti-Co galvanized steel is made by the patented Sendzimir process, a continuous operation in which the heat treatment of the strip and the application of the zinc coating are performed in one continuous galvanizing line. This process eliminates the brittle iron-zinc alloy layer, and results in production of a sheet on which the zinc adheres so tightly that it can be severely formed without flaking of the coating.

Aetna-Standard has designed and built three Continuous Galvanizing Lines for Inland Steel Co.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES ● CONTINUOUS ELECTROLYTIC TINNING LINES ● SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT ● CONTINUOUS BUTT WELD PIPE MILLS ● SEAMLESS TUBE MILLS ● DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT ● ROLLS AND CASTINGS ● EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

Wright cranes keep engines flying through world's largest line-maintenance hangar

...with the help of 480 TIMKEN® bearings

24 motor-driven Wright cranes like the one shown keep engines winging from station to station in the world's largest line-maintenance hangar at Miami. And keeping the cranes on the go are 480 Timken® tapered roller bearings on the bridge wheels and trolley wheels.

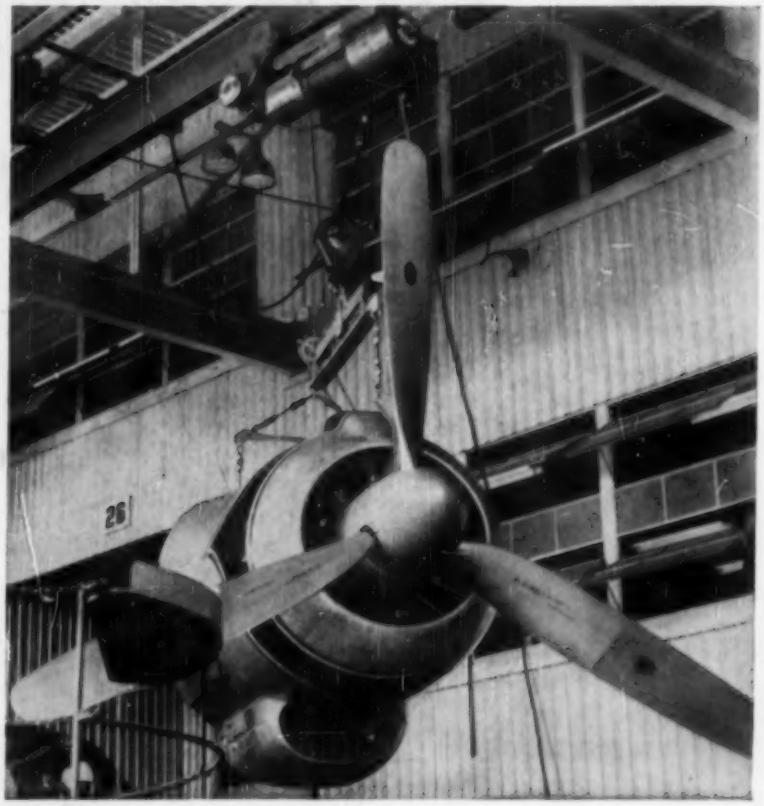
Timken bearings take both the radial loads imposed by the weight of the engines and the thrust loads set up by the pendulum motion of crane operation. The tapered design of Timken bearings lets them take radial and thrust loads in any combination. And full line contact between rollers and races gives these bearings extra load-carrying capacity. Downtime is cut, cranes are kept on the go.

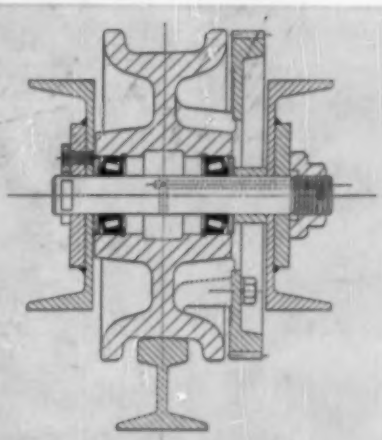
Friction is virtually eliminated with Timken bearings. They're designed by geometric law to have true rolling motion—precision manufactured to live up to their design. Cranes roll smoothly with a minimum of wear and maintenance. And to take the shock loads often encountered, rollers and races of Timken bearings are case-carburized to give them wear-resistant surfaces over tough, shock-resistant cores.

Be sure you specify Timken bearings when you build or buy a machine. To give you the *finest* roller bearings, we even make our own fine alloy steel. We're America's only bearing manufacturer that does.

Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.





How the **WRIGHT HOIST DIVISION** of American Chain and Cable Co. mounts Timken tapered roller bearings on the truck wheels of its cranes to take the loads, keep them on the go.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD